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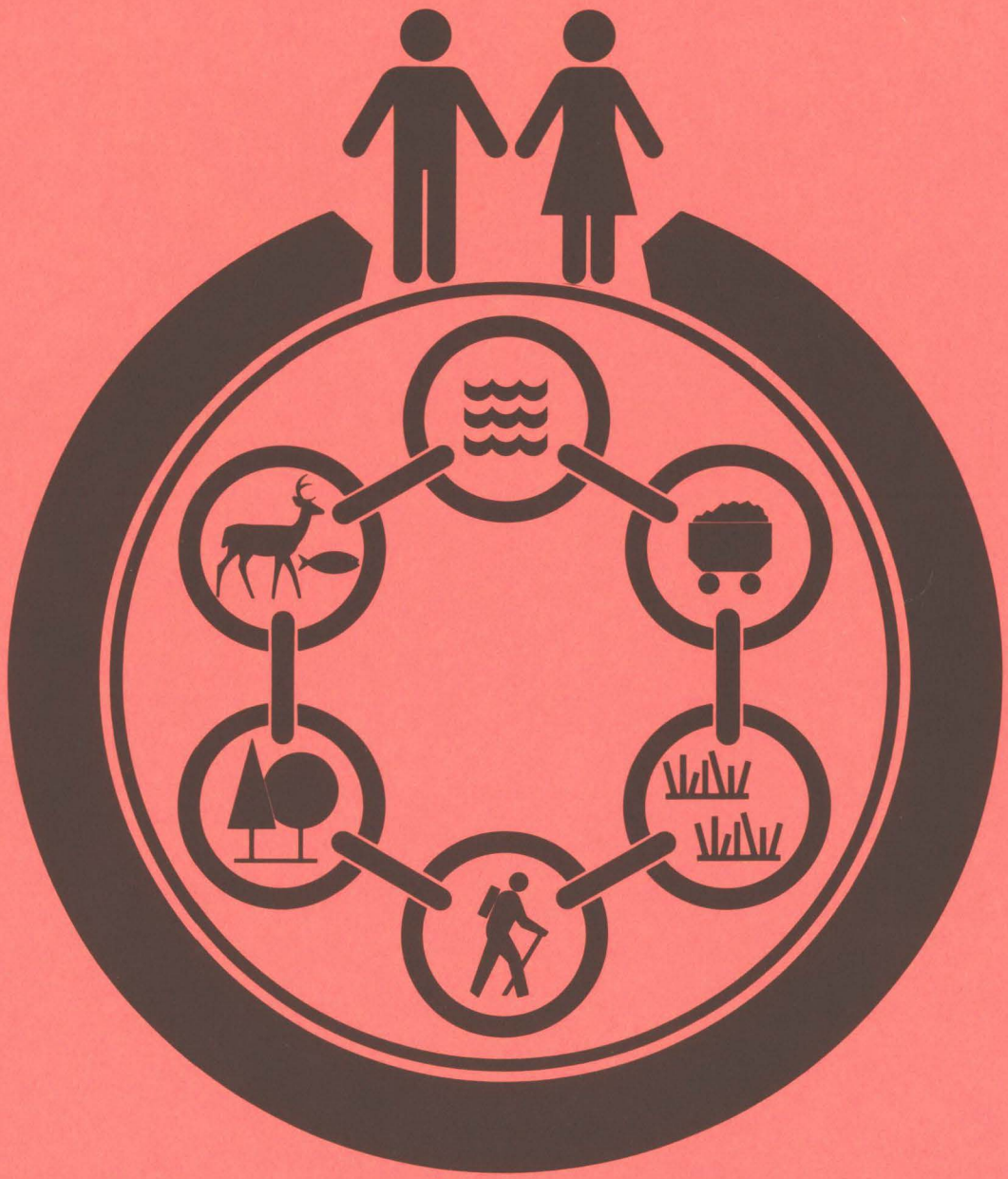
United States
Department of
Agriculture

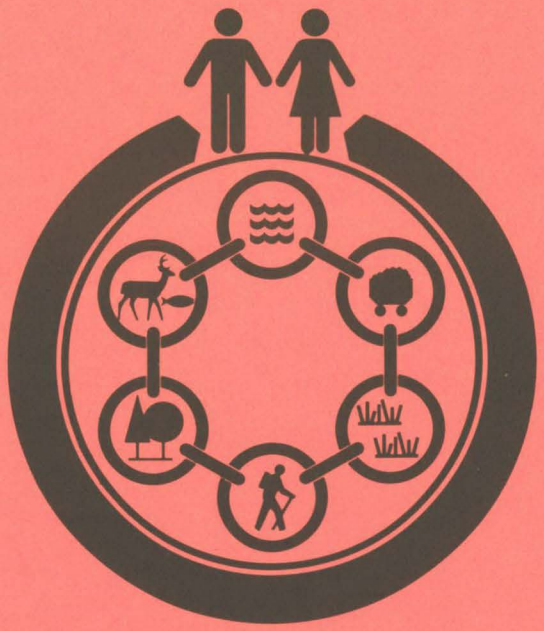
**Forest
Service**

FS-400

A Recommended Renewable Resources Program: 1985—2030

1985 Update





The front cover illustrates integrated natural resource management for Americans. The small circles (from top and clockwise) depict the linked interrelationship in the multiple-use chain of resources: air and water; minerals and energy; range; outdoor recreation; timber; wildlife and fish. The outer circle symbolizes the national and continuous planning of the three major Forest Service program areas...National Forest System; State and Private Forestry; Forest Research...as exemplified by the RPA Recommended Program for the period 1985 through 2030.

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July 1986

INTRODUCTION

THE LEGAL REQUIREMENTS OF RPA

The Forest and Rangeland Renewable Resources Planning Act (RPA) of 1974, as amended, directs the Secretary of Agriculture to periodically assess the status of the Nation's forest and range resources and to recommend a Forest Service program for their management and use. The Act requires the development of an Assessment every 10 years and a Recommended Program every 5 years. The 1985 RPA update is the third Program pursuant to this legislation. This document presents the 1985 Recommended Program for the USDA, Forest Service.

Assessment

The RPA Assessment, which is prepared at 10-year intervals, describes the Nation's renewable resource situation and projects supplies of and demands for these resources. The most recent Assessment was completed in 1979. It shows that demands for resources produced from forest and range lands will increase more rapidly than supplies in the years ahead, assuming the continuation of recent management trends. However, the Assessment also identifies major economic opportunities to increase future supplies of almost all renewable resources. A supplement to the 1979 Assessment was published in 1984 to account for significant changes which have occurred since 1979. For example, it incorporated key findings of the 1980 Census, revised economic projections for the Gross National Product and disposable personal income, and revised resource supply-demand information where appropriate.

Program

The RPA Program recommends a course of action through 2030 for the management and administration of the National Forest System, for Forest Service Research, and for assistance and leadership on private and State forest lands through State and Private Forestry programs. It is based on information and data from a variety of sources including the 1979 Assessment and 1984 Assessment Supplement; analyses of the nine RPA alternatives discussed in the Draft Environmental Impact Statement (DEIS) released in January 1984; public comments on the DEIS; results of the USDA-sponsored National Forum on the Resources and Management of Nonindustrial Private Forest Lands; national direction to assure Program consistency; evaluation of the implications of the Federal Timber Contract Payment Modification Act; and special evaluations designed to respond to current issues and to aid Program development.

President's Statement of Policy

The Assessment and Program are transmitted to Congress by the President with a Statement of Policy intended to be used in framing budget requests for Forest Service activities. The President is to carry out programs of the Forest Service according to the Statement of Policy.

MAJOR FINDINGS OF THE ASSESSMENT

The 1979 RPA Assessment and 1984 Assessment Supplement provide detailed analyses of the Nation's renewable resource situation, and identify economic opportunities to increase supplies of renewable resources to meet projected demands.

In the past, as population and incomes grew and economic activity expanded, the consumption or use of nearly all products of forest and range lands and associated inland waters increased and, in most areas, at rapid rates. This is one of the major findings of the 1979 Assessment, and it has not changed.

The 1979 Assessment also found that demand for most products in the decade ahead is likely to continue rising in response to population and economic growth, and that supplies will increase, although at slower rates. These basic findings also have not changed.

Most of the resource demand-and-supply projections for water, forage, outdoor recreation and wilderness, and wildlife and fish have not changed since 1979. However, a few of the demand-and-supply projections for other resources have been revised in the Assessment Supplement to reflect new data and future expectations. The revisions include:

- Lower projections of long-term demand for softwood lumber, plywood and sawtimber as compared with the 1979 Assessment--a response to a downward revision in the demand for housing and an upward revision in base prices for softwood lumber and plywood.
- A somewhat smaller reduction in softwood roundwood demand--a response to an upward revision in the demand for fuelwood offsetting part of the downward revision for lumber and plywood.
- Higher projections of demand for hardwood roundwood--a response to an upward revision in the demand for fuelwood.

° Higher projections of demand for minerals--a response to improved analytical methods and changed expectations about the outlook for mineral fuels.

A summary of the supply-demand findings of the Assessment follows by resource.

Water

While the United States has an abundant supply of water, its distribution varies greatly across the Nation. In many areas, the demand for water exceeds supply, and inadequate water supplies in some areas are a limiting factor in resource development and economic growth. Water supply projections show that an increasing demand will continue to impact current uses of existing supplies.

By the year 2000, persons living in 17 major river basins in 11 States in the Southwest and Midwest, and in localized areas in the Northwest and East, will suffer serious water supply problems. An estimated 38 river basins in 19 States are already experiencing reductions of ground water. Projected demands for water will be high in the more arid sections of the Nation, reflecting competition for available supplies among agriculture, energy development, and municipal and industrial users. Demands for water for nonconsumptive purposes related to wildlife and fish resources, hydroelectric development, recreation, navigation, and maintenance of wetlands will also increase. While water quality needs vary depending on use, demand to maintain or improve water quality and allow for a greater variety of uses is expected to increase.

About 175 million acres of land scattered throughout the Nation are flood prone. Twenty-one thousand communities are subject to some degree of flooding. Demand for better control of runoff from flood source areas and for reduction of downstream flooding will increase as property values rise and improvements are installed in flood-prone areas.

Minerals

Supplies of some important mineral and energy resources are increasingly difficult to obtain. A significant share of our supplies of energy and strategic materials is produced in other countries, and import dependency is increasing. Availability depends on the international political climate and the world trade situation.

Despite the lack of reserves for a number of minerals, the Nation's mineral resource base is generally extensive. Considerable untapped mineral and energy resources underlie National Forest System (NFS) lands. In many instances, these untapped resources are in remote areas where development has been impeded by debate over whether these lands should be designated as wilderness, or because of difficult terrain, or climatic conditions. Growing demands and higher mineral and energy prices are making mining in remote areas more attractive.

Demand for mineral commodities is not very responsive to price changes. Also, because mineral processing and related technologies are capital intensive, it takes relatively long periods of high prices to prompt the development and application of new, conservation-oriented technologies.

Range

Demand for range grazing by domestic animals in the United States is projected to grow 40 percent by the year 2030, rising from 213 million to 280 million animal unit months (AUMs). Substantial increases in demands for wildlife forage and habitat and for other uses, such as outdoor recreation, are also expected on the Nation's rangelands. Nearly all of the demand for domestic animal grazing will occur in the contiguous 48 States. More than half of the range in all ownerships in the contiguous 48 States is producing at less than 40 percent of its natural potential. (As discussed on page 16, subsequent analyses have indicated that demand for range forage could be lower than the Assessment projection).

Over 70 species of terrestrial plants are currently listed as threatened or endangered and, unless improved management techniques are developed, more species will be listed. Noxious weeds are also invading native forests and rangelands and are diminishing their productivity and multiple-use values.

Recreation

In 1980, outdoor recreation on Federal lands amounted to over 460 million recreation visitor days (RVDs), nearly one-half of which occurred on the National Forest System.

Projections based on expected changes in population, personal income, geographic distribution, age structure, workweek, and work schedules indicate continued increases in demand for outdoor recreational opportunities on forest and range lands. The most significant increases in recreation use are occurring in the Sunbelt and Western States where population growth is most rapid.

Most forest and range lands are located some distance from our Nation's most populated areas. Over 50 percent of the population lives in the North Central and Northeastern Regions, which contain only 10.5 percent of the Nation's forest and range land acreage, 91 percent of which is privately owned. In contrast, the Pacific Coast Region has 13.6 percent of the population and 33.4 percent of the forest and range lands, with only 12 percent of these 520 million acres in private ownership. Private lands will continue to be an important source of recreational opportunities in all regions, but especially in the Northeast, South, and Midwest where there is less public land. Where public use of private forest and range lands for recreational purposes may be limited, demands will tend to be concentrated on public lands.

Wilderness

As of May 1, 1986, Federal lands contain 88.5 million acres in 468 wildernesses. Demand for use of wilderness is projected to grow each year for several decades. Current use levels are close to the desirable upper limits for established wildernesses. The concentration and distribution of use must be managed to protect unmodified natural conditions and to maintain opportunities for solitude. Carrying capacity limits could be reached in 30 percent of the wildernesses by 2000, regardless of investments.

Timber

Timber consumption in the United States increased from about 11 billion cubic feet in the late 1950's to nearly 14 billion in the late 1970's. Data for the early 1980's show that annual domestic harvests are about 9.5 billion cubic feet of softwood roundwood from a total inventory of about 456 billion cubic feet, and 5.3 billion cubic feet of hardwood roundwood from an inventory of 255 billion cubic feet. The following tabulation shows percent of softwood and hardwood inventory by ownership as compared with percent of total harvest and percent of commercial timberland.

Comparison of Roundwood Inventory, Harvest, and Commercial Timberland Area, By Ownership

Ownership	Percent of Inventory			Percent of Harvest			Percent of Commercial Timberland Area
	All Species	Softwood	Hardwood	All Species	Softwood	Hardwood	
NFS	32	46	8	15	20	3	18
Other Public	11	11	10	7	8	6	10
Forest Industry	15	16	12	30	36	14	14
Farmer and other private	42	27	70	48	36	77	58

In response to the surge in housing needs resulting from the baby boom of the 1950's, and despite recent low levels of construction, the analyses prepared for the 1979 Assessment and Assessment Supplement indicate that demand for timber is likely to rise in the 1980's. Long-run projections in the Assessment Supplement, based on expected increases in population, economic activity, and a continuation of the price trends over the past 30 years, show that demands will continue to grow to a level of 25.8 billion cubic feet by 2030--slightly less than the 1979 Assessment projection. This is about 74 percent greater than the current domestic harvest level.

The supplies of timber that will be available to meet these demands, assuming a continuation of recent trends in investments in forest management, show slower increases. This will result in rapid increases in the relative prices (net of general inflation or deflation) of timber and timber products as the marketplace brings about an equilibrium between demands and supplies. The price system may also encourage additional investment above trend levels that could dampen price increases expected with recent management trends.

Wildlife and Fish

The U.S. Environmental Protection Agency reports that up to 2 million acres of fish and wildlife habitat will be lost annually between now and the year 2000. The implications for wildlife and fish are serious: nearly half of the acreage of wetlands that once existed in the lower 48 States is gone, and 20 million of the 25 million acres of hardwood bottomland along the lower Mississippi have been significantly affected. This places a heavier responsibility on public lands that retain wetland qualities. Salmon, steelhead, waterfowl, and those species dependent upon mature timber, wetlands, and riparian areas will continue to decline because there will be less of this habitat nationwide.

Approximately 274 vertebrate species in the United States are federally listed as threatened or endangered. Unless specific management strategies are implemented, the list of threatened and endangered species will increase during the next 20-year period.

OPPORTUNITIES FOR OWNERS OF PRIVATE FORESTS

The 1979 Assessment shows that there are numerous opportunities for investments in timber management that would yield positive returns on nonindustrial and industrial private lands. If these investments are

made, supplies could be increased substantially. There are economic opportunities for more intensive management on 168 million acres of commercial timberland, about one-third of the Nation's total. All but about 10 million of these acres are in private ownership. All economic opportunities on the National Forest System lands are currently scheduled or planned and are not included in these figures. With treatment of these acres, net annual timber growth could be increased by 12.9 billion cubic feet, a volume roughly equal to three-fifths of the current net annual growth. The bulk of opportunities are for softwoods. Full benefits from the treatments would appear several decades after the investments were made. Furthermore, substantial capital, a total of $22.5 billion (in 1982 dollars), over a 10- to 15-year period would be required to do the job on all identified acres.

About three-quarters of the area contains economic opportunities for reforestation or conversion of existing stands. This category includes regeneration of nonstocked acres, harvesting mature stands and regenerating the harvested areas, and conversion of existing stands to more desirable species. Reforestation and conversion efforts would require 88 percent of total expenditures for all treatments; and 90 percent of the increases in timber supply would come from these acres. A recent study shows that providing assistance to landowners by professional foresters, prior to timber harvest, is essential in realizing these opportunities. Preharvest assistance provides better residual stand conditions, and increased returns to landowners, which will provide further incentives for improved management.

Seventy-four percent of the opportunities for treatment and investment are on nonindustrial private ownerships that collectively contain about 58 percent of the commercial timberland in the Nation. A $15.8 billion investment in these ownerships over a 10- to 15-year period would earn financial returns greater than 4 percent measured in constant dollars (net of inflation or deflation) and would boost net annual growth by over 9 billion cubic feet for the next 30 to 50 years. Most of the remaining opportunities are on the 14 percent of commercial timberland in forest industry ownerships.

IMPACTS OF THE EXPORT AND IMPORT OF RAW LOGS

The primary emphasis of the U.S. raw log trade has been on softwood log exports which have increased from 210 million board feet in 1960 to 3,369 million board feet in 1984. In 1980, trade with Japan accounted for about 80 percent of the total U.S. softwood log exports. By 1984 this had declined to 50 percent of the total. Exports to the Peoples Republic of China and to Canada have been increasing: in 1984 they were up 19 and 20 percent, respectively, as compared with 1983. In the long run, the major market for U.S. raw logs is expected to be in the Far East, with Japan, the Peoples Republic of China, and South Korea among the major importers.

In 1984, total softwood log exports were about 35 percent of the value of all U.S. solid wood exports and 15 percent of the value of all wood products--solid wood and paper products. Douglas-fir is the primary softwood log species exported--accounting for approximately 47 percent of all softwood log species exported in 1984.

Forest Service studies of log trade issues and price effects have centered on the potential influence of a United States ban on softwood log exports--particularly those to Japan. The effects of such an action are difficult to predict because Japan may or may not replace U.S. raw logs with finished wood products manufactured in the United States. Japan's domestic forest resources continue to show significant recovery from the effects of World War II, and the Soviet Union has considerable softwood log export supply potential. Any change in softwood log exports is likely to affect prices for logs and also returns to landowners.

Hardwood log exports have grown from 56 million board feet in 1960 to 125.6 million board feet in 1984. Canada and West Germany are, by far, the largest markets for U.S. hardwood logs--importing approximately 40 percent and 23 percent of U.S. shipments, respectively, in 1984. These two countries, along with Taiwan, are expected to be growth markets in the future. Red and white oak are the two most popular hardwood species exported, accounting for approximately 33 and 22 percent, respectively, of all hardwood species exported in 1984.

Hardwood log imports to the U.S. have declined substantially since 1960, from 80.2 million board feet in 1960 to 30.1 million board feet in 1984. A low of 14 million board feet occurred in 1980. There has been a general decline in the shipment of tropical hardwood logs worldwide, with an increase in the sawn wood and plywood trade. However, a major portion of the hardwood import decline in the U.S. can be attributed to the reduced demand for mahogany in the manufacture of fine furniture.

Even though volumes of hardwood log exports are small, exports tend to be of high quality and desired species. This tends to raise prices for these species, benefiting landowners, but increasing costs to the U.S. domestic hardwood industry.

Canadian softwood lumber exports to the United States have also been of increased interest. Canadian softwood lumber consumption in the United States has increased from less than 20 percent of the U.S. softwood lumber market in 1975 to more than 31 percent in 1985. Imports of Canadian lumber are a concern for U.S. producers because the productive capacity in the United States and Canada currently exceeds what

the North American lumber market can absorb. This leads to heightened competition, depressed domestic lumber prices, and employee layoffs. At issue is whether or not relief measures should be established to protect the U.S. lumber industry.

Increasing concern over international trade in forest products suggests the need for greater attention to global forestry issues if future needs are to be met. This should include policies dealing with trade and forest management--as well as increased emphasis on research and technical assistance, particularly to aid developing contries.

POTENTIAL OF THE NATIONAL FOREST SYSTEM TO RESPOND TO THE ASSESSMENT FINDINGS

Water

Forest lands produce about 65 percent of the Nation's total streamflow, mainly due to their location in areas of higher precipitation. Many of the National Forests are located in headwaters of the more arid river basins that are expected to experience water shortages. Programs for water yield increases can be effective in some of these areas. Many water quality problems can also be addressed through proper management of these lands.

Minerals

Lands managed by the Forest Service contain considerable mineral resources. Fifty billion tons of coal underlie approximately 6.5 million acres. This coal resource can satisfy all U.S. domestic needs for over 70 years, based on 1980 domestic coal consumption levels. About 45 million acres, particularly in the Western and Eastern Overthrust Belts, have potential for oil and gas. Some 300,000 acres have oil shale potential. Idaho has significant cobalt deposits. Other areas contain geothermal energy sources, copper, molybdenum, uranium, cobalt, chromium, platinum-group metals, barium, and lead. There is also potential for production of fluorine, tin, nickel, gold, tungsten, and antimony on these lands. The estimated minerals receipts for 1986 are $137 million; by 2030, the minerals program has the potential to more than double these returns to the U.S. Treasury.

Range

National Forest System range encompasses about 102 million acres of grassland, open forests, and other forage-producing areas. This large area is divided into approximately 11,000 range allotments, located in 31 States. Some 16,000 permits are issued to permittees to graze more than 1.3 million cattle and 2.1 million sheep, with annual grazing use amounting to about 10 million animal unit months. This use meets about 5 percent of the current national demand for range forage and is projected to decline to 4 percent by 2030.

Seventy percent of these lands are in satisfactory condition and produce forage near natural potential levels. Bringing all of these lands to their natural potential would allow about 14 million animal unit months of use.

Recreation and Wilderness

Approximately 40 to 45 percent of the Nation's outdoor recreation use on Federal lands occurs on National Forest System lands. Seventy percent of the Nation's 468 wildernesses are on NFS lands. The 191 million acres in the National Forest System offer major opportunities for extending supplies of many recreation and wilderness related uses. In addition, the National Forests contain prime opportunities for winter sports and for dispersed activities. These lands also contain many cultural and natural sites that are unique or of outstanding historical, cultural, archeological, scenic, geological, or ecological value. In total, the National Forests have the resource capacity for meeting additional demands for recreation and wilderness use.

Recreation use also presents a high potential for expanding returns to the Treasury. With existing legislation, receipts from fees in 2030 will total about $110 million as compared with $30 million in receipts for 1986. However, with legislation to expand fees, returns could increase to over $130 million by 2030 and help cover the costs required to meet more user demands.

Timber

The National Forests have the potential to greatly increase the supply of roundwood growing stock to meet future demands. Nationally, total standing inventory of softwood timber is 456 billion cubic feet with 46 percent on National Forests. Softwood sawtimber on National Forest System lands accounts for 51 percent of the Nation's softwood sawtimber inventory in 1976; 96 percent of that is in the western National Forests where old-growth forests are concentrated. This is projected to decline to 46 percent by 1990. About 27 percent of the nation's softwood sawtimber inventory is on the National Forests in Oregon, Washington, and California.

The current net annual growth of softwoods on National Forests is 3.1 billion cubic feet, 20 percent of the national total softwood growth. This is about half the volume of growth attainable in fully stocked natural stands. Greater growth rates, especially for National Forest sawtimber, can be achieved with increased harvest of slow growing, old-growth stands, and regeneration and thinning of young stands. The potential growth of fully stocked natural stands on the National Forests is 6.4 billion cubic feet or about 32 billion board feet. This compares with an average annual National Forest timber sale level of about 11 billion board feet in the last 10 years.

While other resource objectives and environmental constraints may limit production in some areas, the use of genetically improved trees, fertilizers, and other emerging forest management technology shows promise for significant increases in timber productivity on the National Forests.

Capturing the potential of these National Forests could greatly expand returns to the Treasury and by 2030 receipts could be almost 3 times the 1986 level of $1.1 billion.

Wildlife and Fish

The National Forest System contains the potential for substantial improvement in wildlife habitat management. These lands provide significant habitat for about 3,000 vertebrates. They contain 83,000 miles of streams, and 2.7 million acres of lakes with potential for expanding the fisheries habitat for commercial as well as sport use. They also contain the key habitat for approximately 92 threatened and endangered species as Federally listed on January 1, 1986.

Wildlife and fish populations are an important part of the recreation appeal of the National Forest System, and the stability of many private industries dependent on outdoor recreation. The management of wildlife habitat will be an important factor in generating increased returns to the U.S. Treasury from recreation use.

ECONOMIC AND POLICY FRAMEWORK FOR THE PROGRAM

The National Forest System is one of our most valuable national assets. The 191 million acre System contains a significant proportion of the Nation's timber resource: 46 percent of the softwood roundwood inventory and 8 percent of the hardwood inventory. It also contains almost 5 percent of the Nation's rangeland. About $3.5 billion worth of minerals is produced on these lands annually. Slightly more than 32 million acres of wilderness are found on National Forests. Almost 21 percent of the campgrounds and 25 percent of the trails and ski lifts in the U.S. are found on these lands. National Forests also contain half the big game and cold water fish habitat in the United States and over 50 percent of the grizzly bear and red-cockaded woodpecker habitat. Twenty percent of the anadromous fish originate on NFS lands. Currently, the sale of these resources provides revenues that offset nearly 90 percent of the total NFS costs.

Management of a national asset of this magnitude and significance is unique in the Federal government. It requires recognition that a substantial portion of Forest Service expenditures are capital investment needed to maintain and enhance long-term productivity of these resources. It also means that this complex array of resources must be carefully managed to assure that both monetary and nonmonetary returns are commensurate with the substantial value of the National Forest System lands. Assurance of monetary returns is particularly important at the present time when the national debt exceeds $1.5 trillion and recent Federal budgets have resulted in annual deficits of about $200 billion.

An overriding principle guiding the Program recommendations was that the Forest Service, like all Federal agencies, must make every appropriate effort to reduce the Federal deficit. Since the Forest Service is one of the few Federal agencies that generates substantial revenues from its activities, it is in a better position than most to contribute to reducing Federal deficits by enhancing revenues, reducing costs, and making major efforts to improve the efficiency of Program expenditures.

The resources provided by National Forest System lands vary widely, from material goods to amenity benefits. Over the years, systems have been developed for assessing a market price for some uses, while others are provided at reduced fees or at no charge. Often, the direct user does not pay for using the resource; the cost is borne instead by the general taxpayer. The question of who benefits and who pays was considered in development of the Program. Opportunities were sought to reduce costs or increase revenues. Program development also requires recognition of values which are difficult to quantify in dollars. Examples are the wildernesses; programs for recovery of endangered and threatened species: protection of scenic, cultural, and historic values; prevention of soil erosion; and maintenance of clean air and water.

The RPA Program addresses the objectives of economic efficiency and reduction of the Federal budget deficit in a number of ways:

The Recommended Program has been constructed with a range of resource options to permit consideration of both the current Federal deficit situation and our long-term resource goals. The upper portion of the

range reflects earlier and greater investment to meet the longer-term rising demands for resources reflected in the RPA Goals. The lower portion defers some investments in response to the immediate need to reduce costs as a means of lowering the Federal deficit.

As alternatives for the Recommended Program were developed, opportunities for reducing costs were explored at the forest and regional level, so that RPA alternatives would contain the most efficient or cost-effective approaches available. The Program development process considered possible changes in management techniques that would result in cost savings and also accomplish legal, environmental, and multiresource objectives. Furthermore, the Program contains cost reductions that will eliminate many uneconomic activities. Substantial reductions in unit costs are assumed by 2030 in response to new technology. New and emerging technology, along with improved cost effectiveness, is anticipated for improving net benefits from several resources including timber and recreation.

A major assumption underlying the Program is that opportunities to enhance returns to the Government will be captured. A key opportunity is to assure that the beneficiaries of Forest Service programs pay a larger share of the costs. For example, legislation to allow collection of recreation fees at sites and facilities that are currently excluded will result in receipts at High Bound that will offset 50 percent of the cost of the recreation and wilderness management programs by 2030. In this way, persons using outdoor recreation resources will more directly share in paying the costs of providing these activities. Implementation of this expanded fee system is planned for 1987.

The Program also assumes that States will increasingly contribute to wildlife habitat improvement programs. Some States now collect fees through programs such as hunting stamps, and the revenues are used to improve wildlife habitat on both State and Federal lands. Expansion of these contributing State programs will be emphasized to accomplish the RPA Program.

The minerals and energy program emphasizes streamlining the mineral leasing process. It also places maximum responsibility with the States for regulating and reclaiming surface coal mines.

These policies aimed at cost reduction and revenue enhancement improve Program efficiency. With these actions, the Program has a present value of projected total returns to the U.S. Treasury that exceed the present value of total costs. On an annual basis, revenues are about equal to costs until midway through the 50 year planning period; after that time, revenues rise well above costs. To the extent that aggressive programs to improve efficiency are accomplished earlier, revenues could exceed costs earlier in the planning period.

In the State and Private Forestry area, the Program moves toward a greater role by the States in funding programs. Federal funding for forest management and utilization assistance is estimated to be less than 15 percent of total State and Federal total expenditures at present, and will not exceed this rate as these activities are expanded. In Statewide forest resource planning, Federal funding to States will be discontinued, but technical assistance will be retained throughout the planning period. For forest pest management, Federal cost sharing for suppression and prevention activities on non-Federal lands will be discontinued mid-way through the planning period.

Research contributes to more cost-effective management techniques. Large gains have already been realized from silviculture, genetics, protection and utilization research. Significant gains in the future can only be realized by continued investments in research.

Finally, the Forest Service Program will continue to be carried out by high level professionals who understand principles of renewable resource management, cooperative forestry activities, and development and implementation of new technology. The Program recognizes that needs and concerns about how resources should be managed are often conflicting, and that public understanding and cooperation is necessary to achieve balanced renewable resource management in the future.

FORMULATING THE RECOMMENDED PROGRAM

The Program was developed in response to the foregoing economic and policy guidelines. It was also prepared to meet legal, environmental, and multiresource objectives underlying the RPA Program. A Draft Environmental Impact Statement (DEIS) was released for a 90-day public review and comment period on January 10, 1984. The DEIS described nine alternatives and discussed the affected environment and the potential consequences of implementing each alternative. The alternatives displayed a range of Forest Service activities from one substantially below the current level and mix of Forest Service activities to several substantially higher for some or all resources.

Approximately 1800 public comments were received, ranging from letters to detailed analyses. These were individually reviewed and the results used in developing this Program.

Numerous special evaluations were completed in response to questions about the DEIS. Some of the more significant of these were:

Economic efficiency analysis - Completed for the timber, range, and minerals resources to determine the level of production that maximizes Present Net Value (PNV).

Additional studies of resource output values - Completed for major resource outputs to provide as much consistency, comparability, and credibility as possible for resource unit values.

Consideration of the backlog of timber under contract - Completed in response to the 1984 Federal Timber Contract Payment Modification Act which established maximum limits on sawtimber volume under contract and annual sale volumes for 1986-1991 in the Pacific Northwest Region.

Consideration of additional wilderness acreage - Analyzed the effects of more wilderness acreage than in the DEIS alternatives. The larger acreage was based on primitive areas not included in RARE II acreages, and wilderness proposals (by various groups) that were not classified as wilderness or designated for further planning in RARE II.

Special initiatives - Developed special initiatives to respond to several high priority needs identified in recreation and wildlife and fish management. These initiatives would accomplish significant recreation and trail maintenance work and wildlife and fish habitat improvement.

Incremental analysis - Evaluated program alternatives by using a parametric linear programming model. To maximize PNV, the model meets a specified constraint, such as timber volume, by predetermined increments, and determines the optimum mix of alternatives for each increment which maximizes PNV.

National Forum on Nonindustrial Private Forest Lands - Used the findings of the National Forum on Nonindustrial Private Forest Lands, held in St. Louis on October 31 - November 3, 1983, to help shape the State and Private Forestry Program.

Research Evaluation - Completed several studies that analyzed past benefits from research or forecast the consequences of new technology.

During May and June 1984, Forest Service field units prepared an initial analysis of Program response to the Assessment and public comments. This initial analysis was examined in detail and major concerns were resolved at the July Regional Forester and Director's meeting. During July and August, field units revised their initial analysis.

By late August two major issues were unresolved, but were under consideration by Congress: new wilderness designations in many States, and the backlog of timber under contract. In September and October, the Program analysis was revised as decisions on these issues were made. The analysis was completed after the President signed the Federal Timber Contract Payment Modification Act on October 16, 1984. In November and December, Department of Agriculture officials and the Forest Service reviewed the analysis results, public comments, and economic impacts. This resulted in the Secretary of Agriculture's Recommended Program.

During 1985, the Administration and Congress were considering actions or legislation needed to eliminate deficit spending and reduce the National Debt. Subsequently, the Balanced Budget and Emergency Deficit Control Act of 1985 required immediate FY 1986 reductions in government spending. The completion of this long-range Program for the Forest Service was delayed until mid-1986 when near-term budget policies, as well as long-term resource needs were more clearly understood.

THE RECOMMENDED PROGRAM

The Recommended Program is an amalgam of the various alternative programs described in the DEIS. It emphasizes reduction of the Federal budget deficit, increased monetary returns from the National Forest System (NFS), maximum net public benefits, and meeting environmental and legal requirements. The Recommended Program is presented as a range of activities and outputs in order to reflect a short-term policy aimed at reducing the Federal budget deficit and a long-term policy for efficient management of natural resources. In order to describe the scope of the Program, it is discussed in terms of the High and Low Bounds of the range. The course of action described at the High Bound would begin immediately to make new investments and to maintain and restore existing facilities in order to meet the long-term renewable resource goals developed from the findings of the Assessment. At the Low Bound, the Program would be held constant through 1990 and expansion would be deferred in order to make a direct contribution to reduction of the Federal deficit by 1991.

The tabulation below summarizes Program costs in constant 1982 dollars. For comparison with current budgets, Appendix A provides a summary by year from 1986-1990 in 1986 dollars.

	Low Bound				High Bound			
	1986	1990	2000	2030	1986	1990	2000	2030
National Forest System 1/	1509	1386	2247	2578	1509	2048	2482	2651
State & Private Forestry	48	22	53	64	48	74	116	114
Research	112	109	135	154	112	128	154	188
Total 2/	1722	1546	2488	2849	1722	2303	2805	3006

1/ NFS costs include both appropriated and allocated dollars.
2/ Total includes Washington Office costs not shown in the body of the tabulation above.

NATIONAL FOREST SYSTEM

Management of the National Forest System (NFS) at the High Bound responds to the findings of the Assessment, public comments received on the Draft Environmental Impact Statement, and the RPA Goals. The Program response at Low Bound is delayed and resource outputs do not reach levels achieved at the High Bound over the planning period. In addition, the following objectives guided development of the Recommended Program:

- Reduce costs and enhance revenues consistent with the purposes for establishing the National Forests and Grasslands.
- Maximize net benefits subject to meeting environmental and legal requirements.
- Maintain, or improve where economic, the productivity of forest and range lands, to contribute to the growth of the economy and the real wealth of the nation.
- Maintain or improve environmental quality in a cost effective way.
- Minimize short-term disruptions in community stability.

The NFS summary is shown in Table 1.

ECONOMIC EFFECTS

Present net value (PNV) is the primary measure of economic efficiency used to evaluate NFS management alternatives. Present net value represents the economic value of the alternative when the stream of future costs and benefits is discounted to the present. All benefits and costs are expressed in constant (1982) dollars.

Table 1--NFS: National Summary-Historic Trends and Recommended Program

INDICATOR	UNIT OF MEASURE	HISTORIC		RECOMMENDED PROGRAM													
				LOW BOUND						1/	HIGH BOUND						1/
		1980	1985	1986	1987	1988	1990	1993	2000	2030	1986	1987	1988	1990	1993	2000	2030
WATER-MINERALS																	
INCREASED WATER YIELD	THOUS AF	*	*	418	418	418	418	545	790	1350	418	418	552	629	756	1001	1555
ENERGY MINERALS PRODUCED	QUADS	*	*	9.3	9.3	9.3	9.3	9.5	11.2	12.3	9.3	9.3	9.5	9.7	10.0	11.8	13
NONENERGY MINERALS PROD	MILLION $	*	*	2111	2111	2111	2111	2403	3464	3473	2111	2111	2403	2517	2694	3883	3925
RANGE																	
PERMITTED GRAZING	MIL AUM	9.8	10.1	9.8	9.8	9.8	9.8	9.8	10.0	10.3	9.8	9.8	9.8	9.8	10.1	10.3	11.3
IMPROVED RANGE ALLOTMENTS	PERCENT	57	71	75	79	72	71	73	78	87	75	79	83	87	88	91	96
RECREATION-WILDERNESS																	
RECREATION USE	MIL RVD	224	215	215	215	215	216	224	260	340	215	215	226	233	290	310	400
WILDERNESS USE	MIL RVD	9	10	10	10	10	12	13	15	19	10	10	14	15	16	18	25
WILDERNESS MGMT	MIL ACRES	19	32	32	35	35	35	35	35	35	32	35	35	37	37	38	40
TRAIL CONST/RECONST	MILES	431	721	755	502	502	502	2100	3100	2100	755	502	4129	4470	5084	5450	2215
TIMBER																	
TIMBER OFFERED	BIL BF	12.4	11.5	11.4	10.0	10.0	9.0	10.1	11.8	15.6	11.4	10.0	11.5	11.6	12.6	14.0	20.0
TIMBER OFFERED	BIL CF	*	2.1	2.1	1.9	1.9	1.8	2.0	2.3	3.1	2.1	1.9	2.1	2.2	2.4	2.5	3.9
FUELWOOD	MIL CF	*	*	254	261	261	261	266	280	250	254	261	266	277	285	299	265
REFORESTATION	THOUS ACRES	434	370	346	335	335	335	390	430	570	346	335	390	426	438	453	600
TIMBER STAND IMP	THOUS ACRES	457	421	334	302	302	302	370	410	600	334	302	370	404	449	476	632
WILDLIFE/FISH																	
WILDLIFE AND FISH USE 2/	MIL WFUD	*	23	23	23	23	20	21	23	28	23	23	26	28	29	35	40
ANADROMOUS FISH COMMERCIAL HARVEST	MIL POUNDS	*	106	106	106	105	103	103	107	135	106	106	109	114	122	142	177
PROTECTION/SUPPORT																	
FIRE MANAGEMENT EFFECTIVENESS INDEX	$/THOU PROT ACRES	*	*	2158	2001	2200	2400	2300	2000	1600	2158	2001	1950	1832	1603	1601	1600
TIMBER PURCHASER ROAD CONST/RECONST	MILES	9562	6466	6758	6037	6037	6037	6911	7444	9496	6758	6037	8332	8592	9001	9454	11240
ARTERIAL/COLLECTOR ROAD CONST/RECONST	MILES	923	1375	1004	842	842	842	2289	2156	3404	1004	842	2157	2704	2979	2737	4030
HUMAN RESOURCES PROG.	THOU. PERSON YRS	16.1	9.7	9.8	5.6	5.6	5.6	9.4	9.4	9.5	9.8	5.6	9.4	9.4	9.4	9.4	9.5
COSTS (Constant 1982 Dollars)																	
OPERATIONAL	MILLION '82 $	*	871	786	760	760	760	962	1078	1237	786	760	979	1040	1089	1203	1278
CAPITAL INVESTMENT	MILLION '82 $	*	800	723	626	626	626	1009	1169	1341	723	626	908	1008	1141	1279	1373
TOTAL-NFS	MILLION '82 $	*	1671	1509	1386	1386	1386	1971	2247	2578	1509	1386	1887	2048	2230	2482	2651
ALLOCATED	MILLION '82 $	*	151	157	175	175	175	229	308	296	157	175	190	221	266	328	231
APPROPRIATED	MILLION '82 $	2193	1520	1352	1211	1211	1211	1742	1939	2282	1352	1211	1697	1827	1964	2154	2420

1/ The figures shown for 2030 represent a + 5% range that reflects the degree of uncertainty associated with estimating outputs so far into the future. The midpoints of the range were used as the data analysis points.

2/ A total of 32 million hunting and fishing user days were produced jointly by recreation and wildlife and fish in 1985. An estimated 23 million of these user days were produced by the wildlife and fish program and 9 million by the recreation program.

* Data not available.

The calculation of present net value requires an assumption about the discount rate. The primary discount rate used in this analysis is 4 percent, which approximates the long-term measure of the opportunity cost of capital (in real dollar terms) for the private sector of the U.S. economy. An analysis using a 10-percent rate showed that the relative PNV ranking of all RPA alternatives was not sensitive to a change in the discount rate from 4 to 10 percent.

Assumptions about the unit value of outputs are also important when calculating present net value. Some outputs, such as timber, generate actual returns to the Federal Treasury because they are sold in the market place. Other outputs, such as recreation, are provided without charge but also have a value to the users. All values used for the RPA evaluation are estimates of the market price for that output if it were sold in a competitive market. Actual market transactions are the basis for unit values for timber, range, and minerals. For the other resources, special studies were conducted to estimate the market price as if the resource were actually sold. Analyses showed that the ranking of alternatives was not highly sensitive to value changes. For example, the relative ranking of RPA alternatives by PNV does not change when recreation values are reduced by as much as 50 percent.

Present net value is presented in three ways: (1) PNV-Total, which is based on valuing all major resource outputs including those sold and those provided free to the user; (2) PNV-Market, which is based on valuing only market resources; i.e., timber, minerals, range, and commercial fish and pelts; and (3) PNV-Receipts, which is based on actual direct receipts or returns to the U.S. Treasury. Program costs are the same for all three versions of PNV.

The Recommended Program is economically efficient. The present net values are:

	Low Bound	High Bound
	(Billion 1982 Dollars)	
PNV - Total	77.77	103.86
PNV - Market	21.67	25.55
PNV - Receipts	3.63	4.77

The Recommended Program has a high measure of economic efficiency because it: (1) is designed to respond to efforts to reduce costs and enhance benefits; (2) includes a plan to revitalize and maintain existing capital investments and thus avoids major rebuilding costs; and (3) provides for a smooth transition from current Forest Service management so that implementation does not require abrupt organizational changes It also reflects an improvement in national equity since actual users would cover more of the cost of managing the resources.

On an annual basis, receipts are about equal to costs at the High Bound until about 2000 (Table 2). After that, receipts rise well above costs as outputs continue to grow while costs rise much more slowly. In the early years at the Low Bound, receipts exceed costs largely because of cost reductions which reduce the asset base. Receipts also exceed costs through the latter part of the planning period at the Low Bound. The net effect of these relationships is a higher PNV-Receipts at the High Bound. By 2030, receipts exceed costs by 42 percent at the High Bound, while receipts exceed costs by 28 percent at the Low Bound.

Direct receipts to the Treasury are obtained from timber, minerals, recreation, and range resource uses. In present value dollars, the direct receipts to the Treasury will be $39.3 billion from timber, $7.1 billion from minerals, $1.8 billion from recreation, and $.4 billion from range at the High Bound. The present value of the direct receipts to the Treasury at the Low Bound will be $34.1 billion from timber, $6.4 billion from minerals, $1.5 billion from recreation, and $.3 billion from range.

Treasury receipts are not a good estimate of the total value of the NFS to society, since only those outputs that are actually sold are included on the benefit side of the equation. Other benefits are not included in the calculations. The total benefits in the economic efficiency calculations are about one-third direct receipts to the Treasury (one quarter of which are returned to the States) and two-thirds consumers' benefit. Consumers' benefit, the difference between total benefits and returns to Treasury, is the difference between estimated market price and the actual fee that is being collected for the output. It represents the total benefits received by users of the NFS which are in excess of the fees paid by those users. Consumers' benefit is one measure of subsidy to users of NFS lands.

Implementing the Recommended Program at both Bounds will also produce positive regional economic impacts including increased employment, income, and economic activity over the planning period.

Table 2--Comparison of NFS Benefits and Costs
(Million 1982 Dollars)

High Bound

	1986	1987	1988	1989	1990	2000	2010	2020	2030
Direct Receipts									
Minerals	137	149	180	200	220	450	408	366	325
Range	13	13	13	13	13	17	17	18	19
Recreation	30	46	46	48	49	88	104	120	136
Timber	1,132	1,059	1,313	1,474	1,603	1,691	1,979	2,347	2,945
Subtotal	1,312	1,267	1,552	1,735	1,885	2,246	2,508	2,851	3,425
Consumers' Benefits 1/									
Water	81	84	90	95	98	116	124	133	141
Minerals	425	438	502	530	557	799	888	976	1,062
Range	47	48	48	48	48	51	58	64	71
Recreation	1,363	1,364	1,459	1,568	1,677	2,907	3,521	4,135	4,749
Wilderness	86	88	127	138	149	227	287	347	409
Timber	2	2	2	2	2	2	2	2	2
Wildlife/Fish	400	413	461	482	507	711	829	949	1,065
Subtotal	2,404	2,437	2,688	2,863	3,038	4,813	5,709	6,606	7,499
Total Benefits 2/	**3,716**	**3,704**	**4,240**	**4,598**	**4,923**	**7,059**	**8,217**	**9,457**	**10,924**
Costs	**1,352**	**1,211**	**1,697**	**1,762**	**1,827**	**2,154**	**2,228**	**2,319**	**2,420**

Low Bound

	1986	1987	1988	1989	1990	2000	2010	2020	2030
Direct Receipts									
Minerals	137	149	155	161	166	427	387	347	308
Range	13	13	13	13	13	14	14	14	14
Recreation	30	46	46	48	49	70	84	98	110
Timber	1,132	1,059	1,313	1,401	1,472	1,425	1,782	2,139	2,496
Subtotal	1,312	1,267	1,527	1,623	1,700	1,936	2,267	2,598	2,928
Consumers' Benefits 1/									
Water	81	84	79	80	80	96	106	116	126
Minerals	425	438	482	500	518	645	745	845	944
Range	47	48	48	48	49	52	57	63	68
Recreation	1,363	1,364	1,362	1,336	1,310	1,893	2,462	3,031	3,600
Wilderness	86	88	85	94	104	141	169	196	224
Timber	2	2	2	2	2	2	2	2	2
Wildlife/Fish	400	413	410	393	377	458	543	627	713
Subtotal	2,404	2,437	2,468	2,453	2,440	3,287	4,084	4,880	5,677
Total Benefits 2/	**3,716**	**3,704**	**3,995**	**4,076**	**4,140**	**5,223**	**6,351**	**7,478**	**8,605**
Costs	**1,352**	**1,211**	**1,211**	**1,211**	**1,211**	**1,939**	**2,139**	**2,223**	**2,282**

1/ Shows the value of goods and services from NFS lands that are provided without charge to the user. They substantially exceed the direct receipts to the U.S. Treasury.

2/ Includes values for all resource outputs; the sum of direct receipts and consumers' benefit.

NFS COSTS

The NFS costs (appropriated dollars) at the High Bound, rise from $1,352 million in 1986 (1986 actual budget in 1982 dollars) to $1,827 million by 1990 and $2,420 million in 2030. This means program costs grow at an 7.8-percent annual rate from 1986-1990, a 1.7-percent rate from 1990-2000, and a .4-percent rate from 2000-2030.

At the Low Bound, NFS costs fall from $1,352 million in 1986 to $1,211 million in 1987 and remain at a constant level through 1990, and then rise to $2,282 million in 2030. This means program costs fall 10 percent from 1986 to 1987, remain constant through 1990, rise at an annual rate of 4.8 percent from 1990-2000, and a .5-percent rate from 2000-2030.

The NFS workforce required to implement the High Bound increases from 34,114 in 1986 to 46,890 by 1990, 56,826 by 2000, and 60,695 by 2030. The Low Bound workforce requirements would decrease from 34,114 in 1986 to 31,183 by 1990, then increase to 51,446 by 2000, and 59,024 by 2030.

Table 3 shows NFS costs for the High Bound and Low Bound by major resource area. Users of these figures should keep in mind that expenditures in most resource areas provide multiresource benefits.

Table 3--National Forest System Costs 1/
(Million 1982 Dollars)

High Bound

Indicator	1986	1987	1988	1989	1990	2000	2010	2020	2030
Water	4	5	5	6	7	13	14	15	16
Minerals	27	24	24	33	36	44	46	48	50
Range	27	27	33	36	40	49	51	52	54
Recreation	101	90	155	166	174	218	235	252	272
Wilderness	9	10	13	14	17	26	28	30	30
Timber 2/	679	583	841	876	910	1,010	1,058	1,105	1,153
Wildlife/Fish	23	22	47	49	51	79	65	70	76
Protection & Support 3/	482	450	579	582	592	715	731	747	769
Total NFS	1,352	1,211	1,697	1,762	1,827	2,154	2,228	2,319	2,420

Low Bound

Indicator	1986	1987	1988	1989	1990	2000	2010	2020	2030
Water	4	5	5	5	5	11	12	14	15
Minerals	27	24	24	24	24	43	44	46	48
Range	27	27	27	27	27	43	46	48	51
Recreation	101	90	90	90	90	159	223	242	252
Wilderness	9	10	10	10	10	22	24	26	27
Timber 2/	679	583	583	583	583	882	997	1,038	1,051
Wildlife/Fish	23	22	22	22	22	73	60	65	69
Protection & Support 3/	482	450	450	450	450	706	733	744	767
Total NFS	1,352	1,211	1,211	1,211	1,211	1,939	2,139	2,223	2,282

1/ Excludes Land and Water Conservation Fund (LWCF), other funded human resource programs, and KV.

2/ Includes Timber Purchaser Road funds (credit and elect).

3/ Includes air, soil, and water support; FS-funded human resource programs; land management and ownership; facilities and roads; fire and fuel; and general administration.

AIR, SOIL, AND WATER

Air and water quality requirements and long-term soil productivity will be maintained at the High Bound throughout the planning period. Increased opportunities to improve watershed condition will occur after 1990. This responds to public comments which expressed the need for improving soil, water, and air; increasing water yield; and maintaining riparian areas. At the Low Bound, deferring some activities may increase the risk of not meeting watershed productivity requirements, and actions to improve watershed conditions will be limited to the highest priorities.

National Forest System land will be managed to maintain watershed condition as defined by hydrologic function, soil productivity and water quality. Sensitive riparian areas will be managed to assure favorable water quality conditions for fisheries and downstream uses.

The Forest Service is required by laws, Executive orders, court decisions, and regulations to maintain soil, water, and air resources along with preserving and protecting floodplain and wetland values. Most of these requirements are met by developing and implementing watershed and air quality management practices in other multiple-use activities.

Support is provided through forest planning, research, and project evaluation to ensure that risks to soil and water resources are identified and mitigated before project implementation.

Table 4 summarizes soil and water activity levels.

Table 4--Soil and Water Funding and Activities for the RPA Program

		Low Bound			High Bound		
	1986	1990	2000	2030	1990	2000	2030
Funding (Million 1982 dollars)	18.3	19.0	32.0	35.0	24.5	32.4	35.0
Activities							
Improved Soil and Water (M acres)	6.6	9.0	21.0	22.2	12.0	21.9	22.8
Increased Water Yield (MM acre-feet)	.4	.4	.8	1.3	.6	1.0	1.6
Inventory Soil and Water Capability (MM Acres)	7.7	8.3	11.7	9.5	10.3	12.2	9.7

There may be some short-term negative effects on soil, water, and air resource values even though long-term productivity would be maintained. Funding between 1986-1990, particularly at the Low Bound, will increase the risk through 1990 of not fully mitigating soil and water impairment from land-disturbing activities, and meeting requirements of the Clean Air Act to protect air quality related values in 88 Class I areas (designated wilderness with the smallest allowable increment of additional air pollution) administered by the Forest Service. Low levels of funding will also delay work necessary to meet State water rights adjudication schedules in western States, and delay the evaluation of practices used to meet water quality goals as required by the Clean Water Act.

The Forest Service has identified areas of unsatisfactory watershed condition where improvement treatments will increase productivity for timber, range, recreation, and fisheries. Soil and water improvement investments increase after 1990 and will accomplish approximately 60 percent of identified needs by 2030 at the High Bound and 40 percent at the Low Bound. Deferred improvements and inventory during the first 5 years at the Low Bound may also increase the risk of soil disturbance and difficulty in meeting Clean Air Act and water rights requirements. However, the risk of significant long-term impacts is moderated because management activities also remain constant.

There are opportunities to further increase water yields from National Forest System lands. Multiple-use management provides opportunities to increase water yield through the timber program as well as by direct watershed improvement treatments. Most of the increase will result from modification of timber sale design. During the second half of the RPA period, water yield treatments of other areas, such as chaparral lands, will be increased. New technology will also provide opportunities to increase water yields.

Soil and water inventories gradually expand during the RPA period. These inventories are used to provide

information on suitability and productivity for planning and management. This information leads to more efficient practices for producing resources from upland and riparian areas. Approximately 75 percent of the National Forest System will have planning level information within 5 years, compared with 62 percent in 1985.

MINERALS AND ENERGY

The minerals and energy resources management provides expanded opportunities for prospecting, exploration, and orderly development of these resources on NFS lands. Management activities are consistent with growing national needs for energy commodities and strategic minerals. At the High Bound, the number of cases handled rises from 24,000 in 1986 to 38,000 by 2030; at the Low Bound 36,000 cases will be handled by 2030.

Timely processing of permit and lease applications and operating plans will be emphasized. The Program strives to increase benefits to the industrial sectors of the economy and returns to the U.S. Treasury, and to ensure quality management of the mineral and energy resources. Response to resource needs and coordination with other resources are emphasized.

The growing needs identified in the RPA Assessment and Supplement for coal, uranium, lightweight metals, and mineral fertilizers are recognized. The ability to use and export the Nation's abundant commodities are enhanced, and the need to import scarce commodities is reduced. The Program supports the national minerals policy "to decrease America's minerals vulnerability by taking positive action that will promote our national security, help ensure a healthy and vigorous economy, create American jobs, and protect America's natural resources and environment." (National Materials and Minerals Program Plan and Report to Congress, April 5, 1982, p. 2.) Mineral activities produce by far the largest net returns to the U.S. Treasury.

Table 5--Minerals and Energy Activity Levels

		Low Bound			High Bound		
	1986	1990	2000	2030	1990	2000	2030
Funding (Million 1982 $)	27	24	43	48	36	44	50
Caseload (Thousands)	24	27	32	36	30	36	38

Minerals and energy receipts are expected to grow significantly through the remainder of this century. However, by 2030 some decline is anticipated. This will occur as the difficulties associated with finding and producing oil and gas result in sharply reduced production levels. The effects of this reduction on receipts is tempered somewhat by the relatively higher values of oil and gas (compared to coal and other minerals) and the assumption that real prices for oil and gas will increase throughout the planning period at a faster pace than real prices for other mineral and energy commodities.

During the first 5 years, workload is expected to grow more rapidly than Program funding needed to provide the capability to efficiently handle the increased work. This will result in delays in processing minerals and energy permit applications and operating plans through 1990, particularly at the Low Bound because funding remains constant. This may cause delays in economic returns from energy and mineral production, and may increase the risk of impacts due to limited administrative and research support.

At the High Bound, increased funding after 1990 will facilitate keeping up with new work and will help offset effects of previous delays. At the Low Bound, some economic returns will be foregone because of delays through 1990, and higher risks and costs (due to added uncertainty) may be unacceptable to industry. Low Bound funding after 1990 will allow keeping up with new work. but is unlikely to offset effects of previous delays.

The 50-percent increase in minerals caseload projected between 1986 and 2030 will be managed to provide orderly and timely processing and coordination with other resources. Higher costs per case in future years are anticipated based on the growing complexity of multiple-use management. Resource conflicts and concerns can be mitigated by application of information developed by socio-economic research to assure efficient and prudent management of mineral, energy, and other resources. Returns to the U.S. Treasury will continue to be influenced by economic cycles and changes in real price levels.

In the future, coal and lightweight metals development will grow more rapidly. As shown in the Assessment Supplement, development of the Nation's abundant coal resources will increase dramatically during the planning period. Most affected by coal development will be Regions 2, 4, 8, and 9. The interests in lightweight metallic minerals (molybdenum, lithium, beryllium. and others) will grow more rapidly than interests in other nonenergy minerals. Regions 1, 2, 3, and 8 will be most affected by development of these minerals.

RANGE

Per capita red meat consumption (beef, veal, lamb, and mutton) rose from 72 to 135 pounds (carcass weight) between 1930 and 1976. Although there has been a decline to about 110 pounds since 1976, at least partly caused by the economic recession. the projections in the Assessment show the per capita demand for red meat rising to 148 pounds by 2030, some 10 percent above the 1976 peak. In addition, there could be a significant export demand. On the basis of such projected increases. and with consideration of the relative costs of alternative sources of feed, the range grazing demand on all ownerships is projected to increase 40 percent by 2030.

The Economic Research Service estimates national forage capacity for 126 million cattle. The 1986 national herd is about 105 million, which is down in response to the recent decline in red meat consumption. Demand for range forage could be lower than the Assessment projection for 2030 if this relationship between capacity and herd size continues as a long-term trend.

The level of grazing remains the same between 1986 and 1990 at both Bounds because of long term grazing permit obligations. The High Bound will result in a 15-percent increase in domestic livestock grazing over the planning period from 9.8 million animal unit months (AUM) in 1986 to 11.3 million AUM's by 2030. This responds to public comments by improving range productivity through cost-effective management and investments that will improve opportunities for recovering program costs. After 1990, grazing use at the Low Bound will increase by 5 percent from 9.8 million AUM's to 10.3 million AUM's in 2030. The Low Bound contains minimal costs for the first 5 years. For areas that do not have opportunities for more cost-effective investments, grazing will be continued at levels that will avoid adverse social, economic, or environmental impacts.

Range management emphasizes improvement and maintenance of resource productivity. It is guided by production efficiency analyses, market value for forage, and rangeland management technology. Efforts are made to balance expenditures with receipts for range outputs. The program also provides for sustained use by livestock and other herbivores, long-term requirements of wild horses and burros. and other ecosystem attributes such as wildlife habitat, soil and water quality, watershed protection, additional forage for nongame species, and improved opportunities for dispersed recreation.

Ninety-six percent of Forest Service grazing allotments will be under improved management by 2030 at the High Bound as compared with 87 percent at the Low Bound. The current figure for improved management is 71 percent. Improved management will be gained through intensive grazing systems, control of undesirable plants, revegetation of deteriorated ranges, fences and water developments, adjustments in livestock numbers,and application of new management technology. Such improved management results in desirable environmental benefits of reduced soil erosion, improved water quality, and enhanced wildlife and fish habitat.

Livestock grazing on National Forest System land complements livestock operations on private lands and contributes to economic stability for families and communities that are dependent on National Forest System range resources.

Range management practices developed and implemented on National Forest System lands demonstrate and promote sound and practical principles of land use to owners of associated lands--a U.S. Department of Agriculture responsibility shared by the Forest Service.

The range program provides for the protection and management of approximately 1,200 wild and free-roaming horses and burros on National Forest System lands. Population levels will be controlled by removal of excess animals by authorized personnel; upon application, title for these animals will be granted to individuals.

Noxious weeds constitute one of the most serious problems on forest and rangelands today and require immediate attention. Their control will receive high priority in the Program. Noxious weeds will be treated to prevent invasion or re-invasion of National Forest System lands and infestation of associated private agricultural lands. Treatment will be coordinated with local district weed control programs.

High Bound costs start at $27 million in 1986 and gradually increase to $54 million by 2030. Low Bound costs range from $27 to $51 million during the same period. Costs include a combination of expenditures to carry on the grazing program, the wild horse and burro program, and the control of noxious weeds. Receipts are derived from grazing fees.

Based on an analysis of economic impacts, domestic livestock grazing will annually enhance the economies of local communities by $99 million in 1986 and gradually increase to $105-113 million per year by 2030.

Table 6 shows the AUM output levels by Region which will maximize economic efficiency (in terms of present net value) for both Bounds of the Recommended Program. It also shows adjustments from the economic efficiency levels that are needed to accomplish other objectives such as multiple use and community needs.

Table 6--Range Output Level by Region
(Million Animal Unit Months)

Region	Year	Low Bound			High Bound		
		Max. Econ. Effic. Level For Range	Other Objectives and Requirements1/	Total	Max. Econ. Effic. Level For Range	Other Objectives and Requirements1/	Total
R-1	1990	1.1	+.3	1.4	1.1	+.3	1.4
	2030	1.1	+.4	1.5	1.1	+.4	1.5
R-2	1990	2.3	-.2	2.1	2.3	-.2	2.1
	2030	2.9	-.6	2.3	2.9	-.4	2.5
R-3	1990	2.3	+.1	2.4	2.3	+.1	2.4
	2030	1.5	+.6	2.1	1.5	+1.0	2.5
R-4	1990	2.6	-.3	2.3	2.6	-.3	2.3
	2030	3.0	-.7	2.3	3.0	-.5	2.5
R-5	1990	.5		.5	.5		.5
	2030	.5	+.3	.8	.5	+.4	.9
R-6	1990	.7	+.1	.8	.7	+.1	.8
	2030	.8	+.1	.9	.8	+.1	.9
R-8	1990	.2		.2	.2		.2
	2030	.4	-.1	.3	.4	-.1	.3
R-9	1990	.1		.1	.1		.1
	2030	.1		.1	.1	+.1	.2
Natl. Total	1990	9.8		9.8	9.8		9.8
	2030	10.3		10.3	10.3	+1.0	11.3

1/ The AUMs in these two columns are either additions or reductions in response to multiple use objectives and community/industrial needs.

The economically efficient level of range production for 2030 is estimated to be 10.3 million animal unit months with current technology, and the current costs and receipts relationship (based on the current fee system). However, with the anticipated new and emerging technology and actions to reduce costs and enhance revenues, the level of economically efficient production could be even higher.

RECREATION

The Assessment concludes that the demand for outdoor recreation will increase through 2030 because of the continued growth in the U.S. population to an estimated 2030 level of 304 million people, a 32-percent increase as compared with 1981, and a 270-percent increase in real per capita disposable income.

Public comments supported improved quality and higher quantities of recreation, particularly for more unconfined opportunities and inexpensive facilities that provide contrast to urbanization, and user fees to cover a greater share of costs.

The Forest Service provides outdoor recreation opportunities and experiences through access, services, and facilities that are necessary and consistent with management of other resource uses and values. However, in recent years, financial and workforce limitations reduced the agency's capability to manage all recreation activities at acceptable levels. Priorities were changed and different levels of recreation management were implemented. Since 1978, some maintenance and services have been deferred while operation needs were being addressed. Accumulation of deferred maintenance is now the focus for some of the highest priority work because of the potential investment loss and rapidly increasing need for major site and facility restorations. The percent of recreation use at the established quality and management standards has decreased from 74 percent in 1978 to 27 percent in 1985 and results directly in facility deterioration and closure. Quality and management standards include items such as soil protection, litter cleanup, potable water, and sanitation.

The High Bound shows an increase in recreation use from 215 million recreation visitor days (RVDs) in 1986 to 400 million RVDs by 2030. At the Low Bound, recreation use is projected at 340 million RVDs by 2030. Both levels emphasize dispersed recreation opportunities not generally provided in other sectors. The High Bound provides proper maintenance of existing recreation facilities and sites that support dispersed activities. At the Low Bound, the backlog of deferred maintenance will increase through most of the decade of the 1990's. Emphasis is given to recreation opportunities that do not directly compete with the private sector. The private sector is looked upon to provide capital investment for concentrated facilities such as ski areas. The Program provides for increased emphasis to restore quality and management standards.

The costs and effects of the Recommended Program are displayed in Table 7.

Table 7--Recreation costs and outputs by time periods

	Low Bound	High Bound
Costs (Million 1982 dollars) 1/	101 - 1986 90 - 1990 159 - 2000 252 - 2030	101 - 1986 174 - 1990 218 - 2000 272 - 2030
RVDs (Million)	215 - 1986 216 - 1990 260 - 2000 340 - 2030	215 - 1986 233 - 1990 310 - 2000 400 - 2030
Percent of Recreation Use at Established Standards	27% - 1986 20% - 1990 35% - 2000 55% - 2030	27% - 1986 42% - 1990 75% - 2000 75% - 2030
Percent of Deferred Maintenance Accomplished by 2000	11% 2/	100%

1/ Excludes Land and Water Conservation Funds (LWCF) and other allocated funds.

2/ The deferred level of recreation maintenance at Low Bound would increase from $394 million to $500 million by the year 1990, but would be reduced to $350 million by 2000.

The priority for the next 15 years is to restore and improve maintenance of recreation facilities and to rehabilitate trails. This will include significant capital investments in the 1990's. The emphases for recreation will be to: complete the deferred maintenance; amend current fee authority to prov ide a broader base for equitable fees; expand use capacity after 1990; prevent resource damage to key wildlife habitat, sensitive soils, and young timber stands; ensure public health and safety; maintain the public's support for fire prevention, sanitation and clean-up, and regulatory procedures; provide effective public information, education and interpretation; and improve cost effectiveness with the development of new techniques by research.

The focus for rehabilitating recreation trails will be to: complete deferred maintenance work, avoid losses of capital investments and irretrievable resource damage, reduce annual maintenance costs for heavily used trails, protect the public safety, manage distribution of recreation use in high use areas, and facilitate coordination of conflicting uses among hikers, horses, and vehicles.

The High Bound schedules completion of $394 million of deferred maintenance work identified for recreation facilities and trails. Completion of this maintenance work during 1988-2000 will bring at least 75 percent of use to acceptable management standards by the year 2000 and will prevent a continuing accumulation of deferred maintenance and undesirable closures of recreation sites. The public will benefit from better maintained facilities and trails; increased revenues to offset the deferred maintenance expenditures because more facilities can be included in the fee system; and protection of capital investments. The timely completion of the deferred maintenance work will prevent an estimated loss of over $800 million by the year 2000.

The Low Bound continues to defer portions of annual recreation and trail maintenance through 1990. After 1990, the Program will be increased to accomplish annual maintenance and reduce the deferred maintenance. The backlogged maintenance work will be reduced to $350 million by 2000. However, the developed site compacity will have been reduced by 10 to 15 percent. The percent of recreation supply that meet standards established at the Low Bound will reach 55 percent by 2030.

Expanding the recreation fee collection program will provide revenue needed to offset increasing operation and maintenance costs. The potential receipts from additional user fee authority are included in Table 2 at the beginning of the NFS section. Fees provide the opportunity for outdoor recreation users to share more in the costs. Expansion of the recreation user fee program through an amendment of the Land and Water Conservation Act is assumed for 1987 to allow collection of fees at sites and facilities which are currently excluded by law. The recreation program currently collects over $30 million per year. The High Bound revenues increase to $49 million per year by 1990. By 2030, fees will increase to $136 million, a level that offsets 50 percent of the program costs. The Low Bound has less developed site capacity and will provide revenues of $110 million per year, or 44 percent of costs, by 2030.

WILDERNESS

The number of NFS wildernesses has more than doubled since 1983 from 165 to 329. The acreage increased by 25 percent or 6.5 million acres to a total of 32 million. Wilderness use increased 74 percent between 1972 and 1982, partly due to an increased number of areas and partly due to increased use on existing areas. Wilderness use will continue to increase but at a reduced rate compared with the past 10 years. In 2030, wilderness use is expected to be a slightly higher proportion of total National Forest recreation use than it is today.

Wilderness was the most frequently mentioned subject in the public response to the RPA DEIS. Public comments indicated a strong interest in wilderness management to enhance the quality of the wilderness experience. Many commented that certain wilderness areas are overutilized and that visitors should be encouraged to visit less-used wilderness areas. A large proportion of current wilderness use occurs in highly popular areas of concentrated use. Policies to maintain a viable wilderness system which will provide primitive recreation opportunities, and reduce conflicts between wilderness uses and wilderness values are emphasized. Educational programs and an improved trail system will encourage visitors to use less-crowded areas. Wilderness management emphasizes protection of the wilderness resource and enhances the visitor experience through educational programs and improved trail systems. Management practices will be revised as research provides improved technology on managing wilderness for recreation, while maintaining wilderness values.

Wilderness designations are projected to increase from 32 million acres in 1986 to a range of 35 to 40 million acres by 2030. The 1986 level includes all areas designated as wilderness by Congress as of May 1, 1986. At an increase in wilderness area to 35 million acres, wilderness use is expected to increase from the current 4 percent to 5 percent of total National Forest recreation activity. Use would increase to 6 percent if the National Forest total reached 40 million acres.

The High Bound provides adequate funding for this projected range of increase. Limited funding for wilderness management, administration and supporting research at the Low Bound may increase risk of adverse cumulative environmental effects on water quality, wilderness character, and wildlife habitat in heavily used wilderness areas.

Cost of wilderness administration at the High Bound will increase by almost 70 percent during the next few years, from $9 million in 1986 to $17 million in 1990. This parallels the nearly 100 percent increase in the number of wilderness areas designated in 1984. The annual cost requirements will increase to $30 million by 2030. At the Low Bound, costs remain constant from 1987-1990, then rise to $27 million by 2030.

An improved wilderness trail system will direct users toward lesser known and used portions of wildernesses, reduce crowding, and improve the quality of the recreation experience.

The High Bound includes trail improvement and rehabilitation work deferred in the past. This backlog of trail work will be completed by 2000 at the High Bound. The Low Bound defers work on trail maintenance backlog until after 1990 and defers completion until after 2000. This delay in beginning the trail backlog work increases the cost of accomplishing the work, exacerbates the potential for resource damage, and increases the risk to public safety.

TIMBER

The RPA Assessment Supplement, using 1980 as a base year, projected a 15-percent increase in total demand for all timber products by 1990, 30 percent by 2000, and 64 percent by 2030. The relative increase in timber supplied varies, depending on whether the volume sold or the volume actually harvested is used as the base figure for 1980 levels. On the National Forests, the averages were 10.9 billion board feet (BBF) sold and 9.9 BBF harvested (using an average of the years 1976-1985).

The High Bound timber offer level is 11.4 BBF in 1986, rises to 11.6 BBF in 1990, 14 BBF in 2000, and 20 BBF by 2030. The Low Bound reduces timber offer level to 10 BBF in 1987 and 9 BBF by 1990; then rises to 11.8 BBF in 2000, and 15.6 BBF by 2030. Reforestation and timber stand improvements support future harvest levels at the High Bound. At the Low Bound, timber stand improvements and reforestation are held constant through 1990 which will defer needed timber stand improvement until after 1990.

Major timber management priorities are to:

- Increase timber supplies in a cost-effective manner consistent with sustained yield to help meet growing domestic and export demand for wood products, and reduce costs and increase revenues to make timber sales profitable while considering all multiple-use benefits.

- Maintain adequate timber supplies from the National Forests at existing dependency levels for communities not participating in timber industry expansion.

- Reduce insect and disease losses by salvaging damaged timber and maintaining healthy stands through silvicultural treatments.

- Enhance other multiple uses on NFS lands through timber management activities.

The estimated 60 million acres of forest land suitable for timber production contain an inventory of softwood and hardwood sawtimber of approximately 900 BBF, or about 35 percent of the Nation's total sawtimber inventory. In 1976, total sawtimber harvest in the United States was 65 BBF, of which 15 percent, or about 10 BBF, came from the National Forests. Sawtimber production from the National Forests will increase by about 60-75 percent from 1986 to 2030 for the High Bound in response to the expected 50-percent increase in national demand.

Costs and cost-efficient management of the National Forests are primary management concerns. The proposed High Bound sale levels will provide new volume to stimulate dependent industries and enough volume to mix with older higher-priced sales to meet economic efficiency and community stability objectives, particularly in Regions 5 and 6. These new volumes will also enhance Federal revenues. At the Low Bound, the volume will sustain, but may not enhance opportunities for dependent industries. Timber offer levels in the early years reflect the requirements of the Federal Timber Contract Payment Modification Act.

Costs for the High Bound timber program will increase by 34 percent between 1986 and 1990. Revenues will increase by 42 percent. During the next 40 years unit costs are expected to decrease by 27 percent; however, total costs will be 27 percent higher due to a 72 percent increase timber volume.

Management will be intensified where cost effective, and will result in increased timber growth and less mortality loss. High Bound timber offer levels remain relatively stable through 1990 in Regions 1, 3, 5, 6 and 10 to produce a mix of resource emphases for maximum net public benefits. Increases in harvest levels occur between 1986-1990 in Regions 2, 4, 8 and 9 to provide similar public benefits.

The Low Bound timber funding will be constant from 1987-1990--a level 16 percent lower than 1986 funding. Low Bound funding will not sustain a 10 BBF timber offer volume after 1988 because costs are lower in 1987 due to a buyback reoffer volume of 2.6 BBF which can be offered at 60 percent of the cost for new sales. As a result, timber offer volume is 9 BBF in 1990. Budget constraints will also limit pre-sale work needed for the 1991 through 1993 timber sale preparation. After 1990 Low Bound funding levels increase, facilitating an increase of timber to be offered by 4 percent from 1986 to 2000 and by 37 percent by 2030. The relationship between costs and outputs is expected to improve by 5 percent due to new technologies.

Timber management will improve wildlife habitat by providing a healthier forest with a better age-class balance for those wildlife species which favor younger forest stand habitat. There are wildlife species requiring mature or old-growth forest habitat, especially in Regions 5 and 6, whose populations may decline with increased harvest levels. However, there will generally be an increase in habitat carrying capacity for species commonly hunted and fished. More acres of soil will be disturbed than under current harvest levels, but mitigation measures will minimize the adverse impacts. Generally, the effects will occur earlier at the High Bound.

Table 8 shows a Regional analysis of timber sale levels for both Bounds of the Recommended Program. The analysis shows the volume of timber that will maximize economic efficiency (in terms of present net value) based on existing cost-to-output relationships without considering other resource benefits. The table also shows the adjustments from the economic efficiency level to accomplish other objectives.

Table 8 shows an estimated economically efficient level of timber production for 2030 of 13.6 BBF annually based upon current unit cost experience. This level increases to 15.6 BBF at the High Bound and 14.8 BBF at the Low Bound in response to legislation, additional multiple use objectives, improved biological productivity, and community stability needs. Also there will be a concerted effort to reduce costs and increase revenues from future sales through more rapid application of available efficient technology and early adoption of new and emerging technology. Successful achievement of these objectives will reduce costs and enhance revenues; and sales will be increased to 20 BBF annually by 2030 at the High Bound and 15.6 BBF at the Low Bound, increases of 75 percent and 37 percent, respectively, as compared with the 1986 level.

Table 8--Timber Offer Level by Region, 1990 and 2030
(Billion Board Feet)

Region	Year	LOW BOUND			HIGH BOUND		
		Max. Effic. Level For Timber	Other Objectives and Requirements 1/	Total	Max Effic. Level for Timber	Other Objectives and Requirements 1/	Total
1	1990	.82	-0.08	.74	.82	+.27	1.09
	2030	1.35	+.25	1.60	1.35	+.29	1.64
2	1990	.19	+.15	.34	.19	+.30	.49
	2030	.31	+.25	.56	.31	+.27	.58
3	1990	.28	+.10	.38	.28	+.22	.50
	2030	.45	+.05	.50	.45	+.08	.53
4 3/	1990	.12	+.14	.26	.12	+.34	.46
	2030	.12	+.28	.40	.12	+.36	.48
5	1990	1.98	-1.00	.98	1.98	-.21	1.77
	2030	2.30	-.22	2.08	2.30	-.20	2.10
6 3/	1990	5.36	-1.24	4.12	5.36	-.85	4.51 4/
	2030	4.83	+.27	5.10	4.83	+.33	5.16
8	1990	1.54	-.54	1.00	1.54	-.13	1.41
	2030	2.83		2.83	2.83		2.83
9	1990	.76	-.06	.70	.76	+.14	.90
	2030	1.09	+.21	1.30	1.09	+.72	1.81
10	1990	.37	+.11	.48	.37	+.11	.48
	2030	.37	+.11	.48	.37	+.11	.48
National Total	1990	11.42	-2.42	9.00	11.42	+.19	11.61
	2030	13.65	+1.20	14.85	13.65	+1.96	15.61
Volume Adjustment for New Technology 2/				+.75			+4.39
Adjusted National Total, 2030				15.60			20.00

1/ The volume in these two columns shows the upward or downward adjustment to the economic efficiency level of harvest to meet multiple use objectives, requirements to improve long-term biological productivity, legislation requiring more or less harvest, and community stability in the early years of the Program.

2/ Additional timber volume resulting from new technology with some additional total costs is anticipated by 2030.

3/ A departure of timber volume from the long-term sustained yield level is included. Departure volumes of .04 billion board feet (BBF) per year in 1990 through 2000 for Region 4 are projected to reduce insect-caused mortality, with some also provided for dependent community needs. In Region 6, the departure ranges from .20 BBF in 1990 to .17 BBF in 2000 to provide for community stability.

4/ In R-6 during the period 1986-1991, the uncut volume of net merchantable timber under contract and the volume of net merchantable timber offered is restricted by the Federal Timber Contract Payment Modification Act. These limits are 12.3 BBF uncut and 5.2 BBF offered, respectively.

The RPA goal, within limits of capability and available funding, is to offer timber in R-6 at the level permitted by the law.

The RPA analysis at the High Bound assumes that harvest in R-6 will be at historic 20-year average levels through 1990. If the harvest level in R-6 is different from the 20-year average of 3.8 BBF net merchantable (4.5 BBF all products) then the offered level can be adjusted accordingly and still be in compliance with the legislative cap.

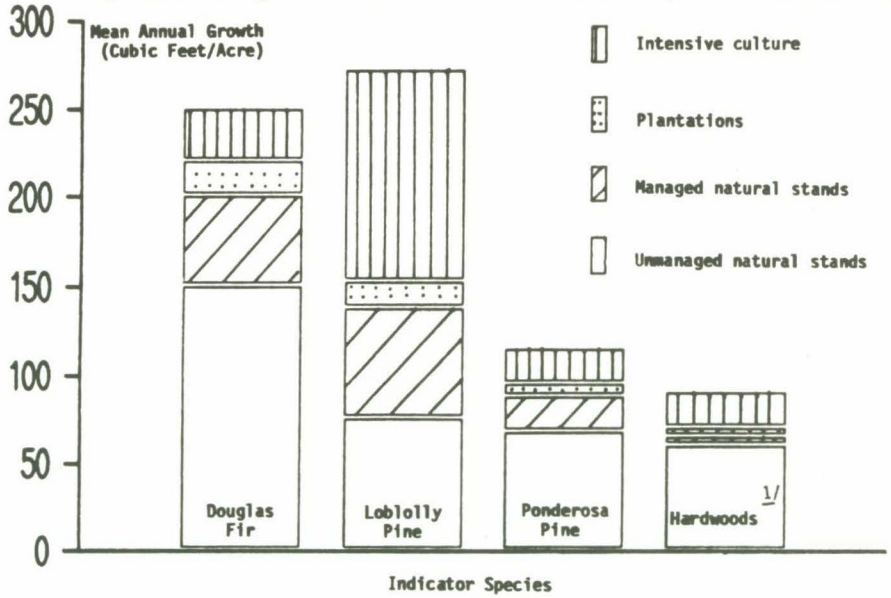
For example, if the harvest level rises to 4.4 BBF net merchantable (5.1 BBF all products), the offer level can increase accordingly and still maintain the uncut volume under contract limit. If this high level of harvest continues, the offer level at the High Bound in subsequent years will be higher.

Several actions will be taken to reduce costs and enhance revenues for both High Bound and Low Bound. The implementation and effects of these actions varies among Regions and timber species. Some of the major changes are:

Reforestation -	Natural regeneration will be used where appropriate to maintain reasonable costs; actions to improve planting successes will be taken; reforestation projects will be identified on a cost-benefit basis and the most effective will be treated first.
Silvicultural Practices -	Alternative silvicultural regimes will be analyzed to identify the most cost efficient; timber stand improvement will be accomplished on a priority basis with the most cost efficient treated first.
Timber Sale Procedures -	Advertisements will be simplified to exclude unnecessary information; economic analyses will be used in setting cutting unit and sale size; more uniform distribution of timber sale offerings will be required unless market demand dictates otherwise.
Timber Sale Volume Determination	Electronic data recorders will be used; accuracy standards will be reduced when appropriate; sample tree quality estimates will be used; data collection will be consolidated or tiered; and use of sample scaling will be increased.
Wood Residue Management -	More effective use of risk evaluations and economic analyses will be made in setting treatment levels; the private sector will be allowed to issue firewood permits; nonproject costs will be reduced.
Roads -	Continued emphasis will be placed on reducing both road construction and unit costs. This will be accomplished through improved analyses and planning of access needs and the use of design standards which are commensurate with minimum user needs.
Revenue Enhancement -	Opportunities to increase revenue by changing requirements for timber sale deposits, appraisal practices, and timing sale offerings to be more responsive to market demand will be studied and implemented where cost efficient.

The research contribution to this improved economic situation will result from new technology in timber growth and utilization, primarily for Douglas-fir and loblolly pine. Figure 1 shows expectations for improving growth potential from research at the High Bound; this will occur during the later years of the planning period. At the Low Bound, research initiatives in timber growth and yield, utilization, and applications of biotechnology will be deferred. Thus, most benefits from this research will not be available until after 2030.

Figure 1--Change in Timber Growth Potential Expected From Research



1/ Includes Yellow Poplar, Mixed Oak, Sweet Gum and Black Cherry.

WILDLIFE AND FISH

The 1979 RPA Assessment and the 1984 Supplement indicate an increasing demand for wildlife and fish resources in all Regions. Public comments on the RPA Draft Environmental Impact Statement expressed a need to improve habitat capability for wildlife and fish. There is also strong public concern and a legislated requirement for protection of sensitive species and recovery of threatened and endangered, species.

Demands for the salmon resource in this country are increasing. Salmon is also an important natural resource in international trade. In 1982, 316 million pounds of salmon were exported to other countries; this contributed $540 million to the U.S. trade balance, $145 million of which is attributable to production from National Forest System habitats.

The Forest Service manages the wildlife and fish habitat on National Forest System lands and States manage the species. There are agreements and cooperative plans with all of the States to ensure coordination, foster more efficient management, and reduce conflicts. These plans provide for habitat improvement in support of other resource programs, and identification of high value game and nongame habitat improvement opportunities in relation to public preferences.

The National Forest Management Act (NFMA) requires the Forest Service to maintain viable populations of all vertebrate species and sensitive plants on National Forest System lands. The Threatened and Endangered Species Act requires the Forest Service to participate in the recovery of approximately 92 species as Federally listed on January 1, 1986. Quantitative objectives have been set, and the Forest Service's share of work toward recovery is planned for completion in the year 2000. Other species sensitive to Forest Service management activities are identified and managed to prevent the need for Federal listing.

The Program provides for 23 million wildlife and fish user days (WFUDs) in 1986, rising at the High Bound to 28 million user days by 1990 and to 40 million WFUDs by 2030. At the Low Bound, WFUDs will decline to 20 million in 1990 and reach only 28 million by 2030. The 23 million WFUDs in 1986 do not include 9 million hunting, fishing, and selected recreation user days counted in the recreation outputs. This means a total of 32 million WFUDs were produced in 1986, but 9 million of these user days are shared because both programs contribute costs and management activities (i.e. fish habitat improvement in a stream adjacent to developed recreation facilities). The current anadromous fish production is 118 million pounds annually for commercial, sport, and Native American fisheries. Commercial anadromous fish production increases from 106 million pounds in 1986 to 177 million pounds at the High Bound and 135 million pounds at the Low Bound by 2030. In 1985, National Forest System production value was $90 million, approximately 21 percent of the Nation's direct economic value from commercial anadromous fisheries and 15 percent of the total fish landed. National Forest System production increases to $205 million at the High Bound and $156 million at the Low Bound by 2030. Priority work involves biological inventory and habitat improvement for Threatened and Endangered (T&E) species and habitat restoration for salmon and steelhead. States are encouraged to expand cooperative funding for habitat work on National Forest System lands. The first 2-3 years of the Program results in no change in habitat capability. However, by the year 2000, the current habitat capabilities are increased for hunted, fished, threatened, and endangered species.

The Program emphasis will: facilitate the timely and efficient accomplishment of resource outputs, such as timber sales, by ensuring that the biological inventory and coordination for T&E species is implemented; complete most recovery schedules within the National Forest System for Federally listed species; provide biological information about sensitive species to avoid further additions to the Federal listing; repair damage and improve the coordination for salmon/steelhead habitat affected by other forest resource projects; and develop new technology for efficiently improving critical wildlife and fish habitats through research.

Two wildlife and fish aspects will receive a special emphasis annually between 1988 and 2000 at the High Bound. The first includes providing the necessary biological information and appropriate actions needed to improve coordination and mitigation for T&E species and ensure the completion of recovery schedules by 2000. Without effective management for these species as other resource demands increase, the costs associated with mitigation, appeals, and litigation relevant to wildife management will increase sharply. The second emphasis item provides for the restoration of key habitat for salmon and steelhead and involves the fulfilling of objectives and recommendations made with cooperating States in the Salmon and Steelhead Habitat Opportunities (SSHO) Program presented in Regional Reports. The National Forest System (NFS) portion of the costs for this program is $200 million--this involves repairing damage caused by past roading, mining, and logging activities on both public and private lands. The demands for commercial fisheries will continue to increase along with other uses and the investment in this work is much more cost efficient to do now than later since further deterioration will compound costs. Without this special emphasis, the production of salmon and steelhead is expected to decrease from the current level of 106 million pounds per year to 103 million pounds by the year 1990.

Special emphasis work in the Low Bound will be deferred until after 1990 and will then be accomplished over a 15 to 20 year period. The objectives remain the same, but the results may be less by 2030 because of the delay. Commercial fisheries habitat restoration work will not influence production until nearly 2000. The Low Bound prior to 2000 will provide less habitat capability and will curtail accomplishment of T&E objectives and other resource operations needing wildlife coordination.

The following table shows a comparison of the wildlife and fish program costs and outputs:

Table 9--Wildlife and Fish Program Summary

	Low Bound	High Bound
Costs (Million 1982 dollars)	23 in 1986 22 in 1990 73 in 2000 69 in 2030	23 in 1986 51 in 1990 79 in 2000 76 in 2030
WFUDs (Million/yr.)	23 in 1986 20 in 1990 23 in 2000 28 in 2030	23 in 1986 28 in 1990 35 in 2000 40 in 2030
Commercial Fish (Million lbs./yr.)	106 in 1986 103 in 1990 107 in 2000 135 in 2030	106 in 1986 114 in 1990 142 in 2000 177 in 2030
Accomplishment of SSHO by 2000	40%	100%
Accomplishment of T&E recovery schedules by 2000	65%	100%
Change in Adm. costs due to suits, appeals, environmental assessment inventories	Cost will increase	Significant decrease in cost

PROTECTION, SUPPORT, AND HUMAN RESOURCES

Fire Management-- Forest and range fire management protects life, property, and wildland resources from wildfire. Prescribed fire will be used, where appropriate, as a cost-efficient tool to protect and enhance the productivity of forests and associated resources. Wildfire technical assistance to States and local governments and comprehensive research will be provided. The High Bound fire protection efficiently meets long-term land and resource management goals and objectives, including the enhancement of environmental and renewable market resource values.

The Low Bound defers priority fuel treatment and provides a lower level of presuppression funding in the early years which may increase suppression costs and loss of resource values. Deferred fuel treatment eventually leads to higher costs after 1990. Maintaining a constant fire management budget through 1990 also increases the gap between growing public use of the National Forests and consequent fire risk.

The Assessment projects increases in population, income, and economic activity which will intensify the use of and demand for natural resource products from public lands. These increased uses and demands cause an increased fire hazard. Adverse social, economic, and environmental effects may result unless increased investments are made to mitigate the increased hazard.

Public comments in the DEIS regarding fire protection were few and general. However, the public expects the Program to include economic efficiencies, water quality and yield protection, and air quality protection. Fire management responds to the public comments by increasing cost-efficient protection levels over time.

Facilities and Roads--The facilities and roads support levels include construction, reconstruction, and maintenance of buildings, related utilities, and general multipurpose roads. It also includes general purpose mapping, transportation planning, and dams management.

Buildings and general multipurpose roads are particularly sensitive to the level of resource activity. Although building construction and maintenance funding increased appreciably within the past 5 years (1981-1985), an accumulation of approximately $400 million more work in essential rehabilitation and reconstruction still exists. Neither High nor Low Bound funding levels for 1986-1990 are sufficient to overcome the backlog nor are they sufficient to enable the Forest Service to move out of high-cost leased facilities. From 1990 to 2030, expenditure projections increase to more reasonable levels at the High Bound. Funding at the Low Bound will require the Forest Service to operate at greater risk levels throughout the planning period.

Priority maintenance work is deferred at Low Bound causing closure of some facilities and heavier use of others during the early years. This increases safety and health hazards as compared with the High Bound. After 1990, the Low Bound provides for completion of deferred maintenance, but costs may be higher than in the High Bound due to greater accumulation of damage.

Road maintenance funding for general multipurpose roads for 1986-1990 is also at an absolute minimum with user safety the primary consideration. Deterioration and disinvestment will persist. This will accentuate the need for future reconstruction.

Lands--The wide variety of real estate activities associated with managing the National Forest System, such as locating and maintaining landlines, acquiring road and trail rights-of-way, making needed land ownership adjustments through exchange and consolidation, administering special-use permits, and maintaining and adjusting landownership status records will be commensurate with other resource uses.

Some activities such as land line location, right-of-way, and special use administration work are reduced or deferred in the Low Bound until after 1990. This, when compared to the High Bound, leads to higher administration costs, project delays, and potential for resource and facility deterioration.

Necessary measures will be taken to protect resources and the public from inappropriate uses such as occupancy involving illegal substances.

Human Resources--The Program recognizes that resource management benefits people in many ways and therefore contributes strongly to the nation's quality of life. It also recognizes the contribution of people to resource management; as visitors, volunteers, employees, and participants in public meetings. The Recommended Program will provide natural resource assistance and benefits to volunteers; to senior citizens; and through work, training, and education to the unskilled, the unemployed, the young, and others with special interests and needs.

Forest Pest Management--Forest pest management activities for NFS and other Federal lands will be at levels commensurate with resource management objectives. The Low Bound budget for research may reduce and delay development of integrated pest management strategies for major forest pest problems including spruce budworm, western bark beetle, gypsy moth, fusiform rust, and wood product pests.

STATE AND PRIVATE FORESTRY

The RPA Assessment showed that domestic demand for wood products is expected to rise 64 percent, from the base year of 1980, during the next 50 years. In addition, there is an opportunity to increase exports of wood products to meet a growing international demand, and contribute positively to the U.S. balance of payments. National and regional timber inventories and growth under current management appear sufficient to meet projected demand through the next few decades. However, after the year 2010, harvest levels are projected to exceed softwood growth and soon after to exceed hardwood growth. The imbalance between expected harvests and growth after 2010 will result in declining timber inventories and increasing stumpage prices. For example, in the South, the real price of softwood sawtimber is projected to increase at an average annual rate of 2.1 percent during the next 5 decades with present management activities as described in the 1979 Assessment and 1984 Assessment Supplement.

Fifty-eight percent of the Nation's commercial forest land is owned by nonindustrial private forest (NIPF) landowners. These lands currently support 42 percent of the Nation's timber softwood and hardwood growing stock and 33 percent of the Nation's sawtimber inventory. This ownership category is characterized by a relatively low level of forest management, and therefore offers the greatest opportunity for increasing timber supplies in this country. For example, it contains 74 percent of all treatment opportunities that will return 4 percent or greater on investments for intensified management.

These NIPF lands are producing at 63 percent of potential and currently are providing 48 percent of the Nation's roundwood supply, including 40 percent of the softwood sawtimber harvest. The Assessment projects that these lands will provide over 50 percent of the softwood sawtimber harvest by 2030.

The objective of State and Private Forestry is to increase the productivity of NIPF lands to meet projected resource demands at a reasonable price. The Program will meet this objective by providing national leadership, incentives, and coordination in forest management, forest products utilization, planning assistance, pest management, and cooperative fire protection. The Federal presence in response to this objective varies within a range defined by High and Low Bounds. The High Bound responds to this objective at Federal funding levels necessary to encourage management and investment on NIPF lands. The Low Bound is designed for the States to assume a greater share of total needs. For example, the Federal share in Cooperative Fire remains at 5 percent at the High Bound; at the Low Bound it declines to 2 percent. All funding to States would be eliminated at the Low Bound, except for some contracting for information gathering or other services essential to the Federal Government, such as statistical data on acres burned and number of fires by size class, causes of fire, acres protected, and data needed to determine program efficiency.

Both the High and Low Bounds rely on the States and the private sector to provide an increasing share of the cost over time. Federal funding for forest management and utilization assistance, expected to be less than 15 percent of total expenditures at present, will not exceed this rate over the planning period at the High Bound, and will decline at the Low Bound. Federal funding to the States for Statewide forest resources planning will be eliminated at the Low Bound, and provided only through the year 1993 at the High Bound. Federal cost-sharing for forest pest suppression and prevention activities on non-Federal lands will be limited to 25 percent by FY 2000 and will be discontinued by 2015 at the High Bound; at the Low Bound, Federal funding for these activities will be discontinued after 1986.

With increased investments over the planning period, some of the undesirable trends projected in the Assessment can be offset. The High Bound is practical; it incorporates the preferred State programs as identified in the Statewide Forest Resource Plans, most of which have been completed recently. It includes the aggregate State programs developed from the best data the States have available and represents an economically efficient level. At the Low Bound, Federal costs would provide technical assistance and focus on critical national and State issues. The States must fund the cost of programs projected in their plans if the total program is to be equally as efficient as the High Bound.

If the States provide necessary funding at the Low Bound, the entire range of the Program would respond to the forestry components of the USDA National Conservation Program, and the Resources Conservation Act (RCA) appraisal of forestry needs for watershed protection and improvement on non-Federal lands. It would respond to the findings of the 1983 National Forum on Nonindustrial Private Forest Lands that are summarized below:

- --Unanimous agreement on need to have more effective efforts devoted to increasing the productivity of nonindustrial private forest lands to meet future domestic and potential export opportunities.

- --Strong agreement that maintenance of the current situation and current actions will not achieve the desired increases in productivity.

- --Agreement on the need for national level leadership to provide policy direction, coordination, and national focus, and State and local action groups to coordinate on-the-ground activities.

Table 10--S&PF: National Summary-Historic Trends and Recommended Program

INDICATOR	HISTORIC		RECOMMENDED PROGRAM														
			LOW BOUND							HIGH BOUND							
	1980	1985	1986	1987	1988	1990	1993	2000	2030	1986	1987	1988	1990	1993	2000	2030
	(Millions of 1982 Dollars)																
FOREST MANAGEMENT	**23.9**	**12.1**	**11.0**	**2.3**	**2.3**	**2.3**	**3.3**	**5.7**	**7.0**	**11.0**	**2.3**	**17.9**	**20.8**	**25.9**	**37.3**	**36.8**
FOREST MANAGEMENT	22.3	10.6	9.0	2.3	2.3	2.3	2.4	2.7	3.0	9.0	2.3	9.9	13.5	18.5	18.7	20.0
SOIL & WATER IMPROVEMENT	*	*	0.5	0	0	0	0.3	1.0	1.5	0.5	0	1.5	2.5	2.9	10.1	7.3
NURSERIES	1.6	1.5	1.0	0	0	0	0.2	0.5	0.7	1.0	0	5.5	3.6	3.0	5.9	5.0
TREE IMPROVEMENT	*	*	0.5	0	0	0	0.4	1.5	1.8	0.5	0	1.0	1.2	1.5	2.6	4.5
FOREST PRODUCTS UTILIZATION	**5.4**	**0.8**	**0.8**	**0**	**0**	**0**	**1.2**	**4.0**	**8.7**	**0.8**	**0**	**2.5**	**2.7**	**3.4**	**7.8**	**8.7**
STATEWIDE FOREST RESOURCES PLANNING	**3.6**	**0.9**	**0.8**	**0**	**0**	**0**	**0.2**	**0.5**	**0.8**	**0.8**	**0**	**2.7**	**2.9**	**4.1**	**4.4**	**4.0**
PLANNING	2.6	0.9	0.8 1/	0	0	0	0.2	0.5	0.8	0.8	0	2.6	2.7	3.6	3.4	3.0
ORGANIZATION & MGMT. ASS'T.	1.0	0	0	0	0	0	0	0	0	0	0	0.1	0.2	0.5	1.0	1.0
FOREST PEST MGMT - COOP LANDS	**4.3**	**7.7**	**6.7**	**0.6**	**0.6**	**0.6**	**1.3**	**3.0**	**4.0**	**6.7**	**0.6**	**8.3**	**7.4**	**8.1**	**10.0**	**6.4**
SURVEY AND TECH. ASS'T.	2.4	1.7	1.5	0.6	0.6	0.6	1.3	3.0	4.0	1.5	0.6	3.2	3.4	4.1	6.0	6.4
SUPPRESSION	1.9	6.0	5.2	0	0	0	0	0	0	5.2	0	5.1	4.0	4.0	4.0	0
FOREST PEST MGMT - NFS AND OTHER FED.	**20.2**	**17.8**	**16.8**	**15.0**	**15.0**	**15.0**	**19.4**	**29.8**	**31.8**	**16.8**	**15.0**	**22.0**	**23.6**	**27.1**	**29.8**	**31.8**
SURVEY AND TECH. ASS'T.	11.8	9.7	9.3	9.5	9.5	9.5	11.1	14.7	15.3	9.3	9.5	11.6	13.0	14.2	14.7	15.3
SUPPRESSION	4.5	7.0	6.5	4.5	4.5	4.5	7.0	12.6	14.0	6.5	4.5	7.9	8.0	10.3	12.6	14.0
SPECIAL PROJECTS	3.9	1.1	1.0	1.0	1.0	1.0	1.3	2.5	2.5	1.0	1.0	2.5	2.6	2.6	2.5	2.5
COOPERATIVE FIRE PROTECTION	**29.4**	**12.1**	**10.8**	**2.8**	**2.8**	**2.8**	**4.7**	**9.0**	**11.0**	**10.8**	**2.8**	**13.8**	**15.3**	**18.7**	**24.9**	**24.9**
GENERAL ADMINISTRATION	*	**0.8**	**0.8**	**0.8**	**0.8**	**0.8**	**0.8**	**0.9**	**1.0**	**0.8**	**0.8**	**0.8**	**1.0**	**1.2**	**1.7**	**1.7**
TOTAL APPROPRIATED	**86.8**	**52.2**	**47.7**	**21.5**	**21.5**	**21.5**	**30.9**	**52.9**	**64.3**	**47.7**	**21.5**	**68.0**	**73.7**	**88.5**	**115.9**	**114.3**

* Data not available.

1/ FY 1986 Funding for SFRP comes from monies included in the following budget items: Forest Management, Forest Pest Management and Fire Protection.

--The Forum participants emphasized that State forestry agencies have a key role in increasing productivity on NIPF lands; consultants and the forest industry will have an increasing responsibility on these lands; landowners need more management information, and there is a need to improve and expand information and education programs; and Federal Government activities are necessary for national focus, funding, and coordination.

Conservation provisions of the Food Security Act of 1985 direct that, to the extent practicable, not less than one-eighth of the highly erodable cropland converted to permanent vegetation be planted to trees. It is estimated that at least 5 million acres of trees will be planted during the 1986-90 period, mostly in the Southeast. The additional timber production opportunities provided by this Program will substantially increase chances of reaching the long term timber goal.

S&PF COSTS

Costs at the High Bound for S&PF begin at $47.7 million in 1986 (actual budget for 1986 in 1982 dollars), rise to $73.7 million in 1990, $115.9 million in 2000, and decline to $114.3 million by 2030 (Table 10). At the Low Bound, S&PF costs begin in 1986 at $47.7 million; decline to $21.5 million in 1987 and remain at that level through 1990; then rise to $52.9 million by 2000, and $64.3 million by 2030. Increases in Low Bound costs occur because the elimination of cost sharing is more than offset by an increase in forest pest management costs on Federal lands. Without these Federal pest management costs, S&PF costs decline from $31 million in 1986 to $23 million by 2000, and then gradually rise to $33 million by 2030.

The S&PF workforce required to implement the High Bound increases from 552 in 1986 to 713 by 1990, and to 800 by 2000; the workforce will remain at that level for the remainder of the planning period. The Low Bound workforce will decrease from 552 in 1986 to 433 by 1990; after 1990, workforce will increase to 720 by 2000, and to 750 by 2030.

FOREST MANAGEMENT

Both the High and Low Bounds assume a strong, expanding role in forest management by State and local governments to increase timber productivity on NIPF lands, particularly after 1990. Emphasis is on landowner assistance prior to timber harvest to provide for better residual stand conditions, and increased returns to landowners, which will provide further incentives for improved management.

High Bound funding for cooperative forestry assistance in forest management, soil and water improvement, nurseries, and tree improvement will be $11 million in 1986, and will increase to $20.8 million by 1990 and $36.8 million by 2030. Reforestation and timber stand improvement accomplishments of 403,000 and 195,000 acres, respectively, in 1986 will more than double by 2000 to the level indicated in State Forest Resource Plans. For 1986, the Program contains Agricultural Stabilization and Conservation Service funding of landowner incentives: $11.2 million for the Forestry Incentives Program and $8.1 million for the Agricultural Conservation Program. These funds are assumed to increase over time in accordance with Statewide Forest Resource Planning. This level will produce 2.2 billion cubic feet of increased softwood timber annually by 2030. At the Low Bound, Cooperative Forestry Assistance will be funded at $11 million in 1986; however, no funding will be available for this work from 1987 through 1990, except for $2.3 million to provide assistance to the State of Minnesota in implementing the Boundary Waters Canoe Area Wilderness legislation. After 1990, a gradual increase in funding to $7 million by 2030 will provide Federal technical assistance to support an increasing State program. This means that maintenance of needed levels of reforestation and timber stand improvement will require that the States establish necessary landowner incentives to replace declining Federal funding at the Low Bound.

S&PF reforestation and timber stand improvement accomplishments would nearly double by 2000 at the High Bound. This requires a commensurate increase in tree nurseries and tree improvement activities in the early years to provide desirable planting stock to support reforestation. Research has shown that productivity can be increased up to 15 percent by using seedlings developed from first generation, genetically-improved stock. Second generation stock can add another 10 percent. The objective in tree improvement is for State nurseries to produce 100-percent genetically improved stock by 1990. With High Bound funding, 75 percent of this objective will be achieved by 1990 and be fully achieved by 2000. At the Low Bound, Federal cost sharing is eliminated, and Federal participation will be limited to transfer of technology by Forest Service specialists; by 2030, this technical assistance funding is only one-fifth of the High Bound.

The Forest Service is responsible for the forestry component of the USDA National Conservation Program. The technical assistance provided to NIPF landowners under this program is responsive to both the RPA Assessment and the Resources Conservation Act (RCA) appraisal of forestry needs for watershed protection and improvement on non-Federal lands. At the High Bound, assistance will be substantially increased, particularly after 1990, to address these needs in cooperation with other Federal and State agencies.

Increased watershed protection and improvement will more than double by 1993. At the Low Bound, specialized watershed management assistance will be provided to support an increasingly State-funded program.

The Cooperative Forestry Assistance Act emphasizes the importance of improving and maintaining a full range of forest resources. This is achieved primarily in conjunction with timber management activities, and by specific recommendations in forest management plans. The High Bound will provide substantial increases in outputs of other forest resources. It provides for a 17-percent increase in acres covered under management plans by 1990, with substantially increased outputs of other resources shortly thereafter. It will also increase technical assistance for dispersed recreation and wildlife habitat improvement by 150 percent by 1993. Funding at the Low Bound will rely on past Federal technical assistance through 1990 to improve and maintain other forest resources. After 1990, some Federal technical assistance will be provided. However, effects at the Low Bound will ultimately depend on expanded non-Federal funding sources.

FOREST PRODUCTS UTILIZATION

Technical assistance to loggers and processors is provided by on-the-ground Federal and State forest products utilization specialists in several major program areas: harvesting, primary and secondary processing, and marketing.

The High Bound provides funding for forest products utilization at $800 thousand in 1986, and 2.7 million in 1990. The Low Bound relies on past Federal technical assistance during the 1987-1990 period. However, after 1990, both the High and Low Bounds will expand to help meet future needs for more wood by increasing supplies of usable material from available forest resources on all ownerships. The Low Bound will require increased funding from other sources, as Federal cost sharing is eliminated. Annual usable wood volume will be increased by 145 million cubic feet in 1990, and 250 million cubic feet by 2030, an increase of 10 and 89 percent, respectively.

STATEWIDE FOREST RESOURCES PLANNING

The Statewide Forest Resources Plan (SFRP) is a comprehensive policy plan prepared by the State Foresters and State Forestry Coordinating Committees, with Forest Service cooperation, to provide guidance for forestry-related activities on all forest lands within each State, regardless of ownership. The plan concerns itself with forest and related resources and makes recommendations for programs and policies, not for specific land uses. The SFRP will assure improved and accurate State data for Federal planning and provide the framework for programs leading to an increase in national timber output and new jobs.

Both the High and Low Bounds emphasize planning assistance for economic development of Statewide forest resources through comprehensive program planning. States will maintain a permanent planning capability, and will rely on the Forest Service to provide major technical assistance in economic analyses. Funding for both Bounds in the 1986 budget is $814 thousand which will come from benefitting programs in forest management, forest pest management, and fire protection.

High Bound funding, at $2.9 million for 1990, will support approximately half the estimated State planning expenditures; State financial assistance will be eliminated after 1993. Federal staffing of 20 professionals will provide technical assistance to State planners, including timber supply/demand analyses for some timber-oriented States.

The Low Bound will rely on State funding to maintain forest resources planning. Financial assistance is eliminated. Moreover, the Program will rely on past Federal technical assistance during the 1987-1990 period. After 1990, some Federal technical assistance will be provided, but Federal staffing will be limited to 8 professionals. They will concentrate on a few pilot States to emphasize basic economic analysis concepts for other States to use.

FOREST PEST MANAGEMENT

Forest pest management has two components--one for Federal lands and one for State and private lands. The Federal component responds to pest management needs identified in the National Forest land management plans and to estimated needs for other Federal lands. The component for State and private lands responds to pest management needs identified in Statewide Forest Resource Plans.

Survey and evaluation of pest activity is provided on all lands. This activity is performed directly on Federal lands and in cooperation with States through technical assistance and cost sharing on State and private lands. Extensive surveys reduce the probability of undetected pest outbreaks. Evaluation of the biological, economic, and environmental factors determines the need for suppression. An integrated pest management (IPM) approach will be used by National Forest System land managers to protect forest resources with the least hazard to humans, their possessions, wildlife and fish, and the environment. Other Federal as well as State and private land managers will be encouraged to use IPM methodologies in pest suppression and prevention activities on lands they manage.

Forest pest management also supports special projects to obtain information on losses due to pests, to bring new or improved technology into use, and to assess benefits and risks of using pesticides. All pest management activities are commensurate with the goals and objectives of resource management.

Forest pest management for Federal lands is the same at both the High and Low Bounds by 2000. The High Bound survey and technical assistance, suppression, and special projects will total $16.8 million in 1986, rise to $23.6 million in 1990, and $31.8 million by 2030. Low Bound funding will constrain these activities at $15 million during the 1987-1990 period.

In the State and private land component, the 1986 budget for survey and technical assistance is $1.5 million, and for suppression, $5.2 million. For 1990 the High Bound will fund these activities at $3.4 and $4 million, respectively. The High Bound provides for funding the States under the Cooperative Pest Action Program to support pest management activity essential to the Federal Government. It also includes technical assistance from Federal specialists over the entire planning period. Federal cost sharing for suppression on non-Federal lands will be limited to 25 percent by 2000, and discontinued after 2015.

The Low Bound funding of $600 thousand in the 1987-1990 period will permit the Federal government to purchase State-collected data on forest pest conditions to make national assessments. The Cooperative Pest Action Program is eliminated at the Low Bound; and no Federal technical assistance will be provided before 1993, and only limited assistance will be provided after that time. Federal funding for suppression on non-Federal lands will be discontinued after 1986, except on private lands intermingled with Federal lands when necessary to protect the Federal lands.

COOPERATIVE FIRE PROTECTION

The improvements in efficiency of wildland fire protection provide national benefits as well as benefits to States and local citizens. National benefits include: reduction in the overall (Federal plus State plus private) costs of protecting forest ecosystems and their products; reduction in the costs of producing wood products; and release of labor and capital for use in other production processes. The effect of these efficiency gains is enhancement of national economic growth.

The High Bound is aimed at development of economically efficient individual State wildland fire-protection programs, improved efficiency through cooperation among States, and improved efficiency among States and Federal agencies. This approach was made possible by development of two new management systems: the Fire Management Analysis System, and the National Interagency Incident Management System. The Fire Management Analysis System applies economics to fire planning, fire suppression, and mobile suppression forces. This tool permits direct assessment of efficiency. The National Interagency Incident Management System provides an organization whereby cooperating agencies exchange suppression resources, and resolution of jurisdictional and policy issues is predetermined.

Cooperative fire protection at the High Bound is commensurate with the value of natural resources and products that could be damaged or destroyed by fire. The activities showing the greatest national benefit will receive highest priority. The Federal share of this funding will remain at 5 percent over the planning period. High Bound funding will reach $15.3 million by 1990, and $24.9 million after 2000.

At the Low Bound, Forest Service involvement in the development of an efficient State fire protection program will be lessened. Financial assistance to the States is eliminated after FY 1986, and greater reliance is placed on local units to fulfill their own fire protection responsibilities. Less emphasis is placed on capturing the collective efficiency of all units involved in fire protection. Low Bound funding of $2.8 million in the 1987-1990 period will limit the Federal role to providing focus on critical issues and specialized technical assistance. After 1990, this activity will increase commensurate with the increasing value of natural resources and products protected.

RESEARCH

The mission of Forest Service Research is to develop knowledge and technology that increases economic growth and environmental capabilities on all of America's forest and range lands. A primary focus of the RPA Research Program is to support cost-efficient management of National Forest System lands that recognizes environmental goals, legal requirements, and needs of the Nation as well as local communities. Attainment of this objective depends on how well we develop and manage technological innovations. The significance of technological change is that it applies knowledge gained for better use of scarce and expensive resources.

The management program planned for the National Forest System depends in part on a continuing flow of new technology from Forest Service research. The ability to meet planned output levels is directly related to early investments in research and a strong research program is very likely to result in resource outputs in excess of those shown at levels of investment described in the Program.

Potential cost-saving technologies include genetically improved trees, more efficient nonpetroleum-based adhesives, less costly forest regeneration techniques, integrated pest management, and more efficient land use planning. The need for research is also accentuated by natural and man-made problems such as acid rain, by the discovery of new techniques like genetic engineering and use of microcomputers, by demands for expanded production of forest outputs, and by legislative actions calling for environmental maintenance such as protection of threatened and endangered animal and plant species.

In preparation for the 1985 RPA Program update, Forest Service Research was completely reevaluated in light of future needs, historical research trends, and responsiveness to national policies. Panels of public and private scientists, managers, and users identified the highest priority research areas. Potential benefits of current and needed research efforts were compared with anticipated costs, and priorities have been established, and are reflected in Figures 2 & 3 below.

RESEARCH COSTS

Program costs for Research begin at $100.4 million in 1986 (actual budget for 1986 in 1982 dollars) (Table 11). By 1990, at the High Bound, research costs will be $112 million; by 2000 High Bound costs will reach $135 million; and by 2030, $164 million. Low Bound costs will be $97 million in 1990, $118 million in 2000, and $135 million in 2030. Research staffing will start at 2,416 in 1986, and range from 2,600 to 2,300 in 1990; 3,025 to 2,750 in 2000; and 3,500 to 3,025 in 2030.

COMPONENTS OF THE RESEARCH PROGRAM

The Research program has two major components: 1) the base level and 2) additional research initiatives. Understanding the need for both components relies on an appreciation for the substantial increase in productivity and benefits which can result from devoting additional resources to research. These major components are illustrated in Figure 2.

Base Program

A substantial portion of the base program is aimed at sustaining technological effectiveness. Forestry has become increasingly dependent on sophisticated technologies to manage and utilize forest outputs. This dependency requires continuing research to maintain current levels of technological capability and effectiveness. The core idea in this sustaining research is that once productivity is improved--due to biological, mechanical, or new management technologies and innovations--a continuing level of research is needed to prevent productivity from declining.

Other research in the base program is classified as enhancing research--research to increase technological capability and effectiveness. Separating the base program into productivity sustaining and enhancing categories should not imply that scientists function in only one of the two areas. Generally, the same scientists do both. The principal point is a recognition of the amount of resources and scientific time required to maintain a minimum level of technological capability.

The base program is constantly being re-evaluated to provide a balance between sustaining and enhancing research. Twenty percent of the base program is re-evaluated annually, and about 5 percent is redirected to new priority areas. About 50 percent of the base program has already been redirected into high priority research areas identified in past analyses (to achieve productivity gains, product quality improvement, and environmental enhancement). During the next 5 years, some of these commitments will be completed and about 25 percent of the total base program will again be redirected into new initiatives.

Table 11--Research: National Summary-Historic Trends and Recommended Program

INDICATOR	HISTORIC		RECOMMENDED PROGRAM												
			LOW BOUND							HIGH BOUND					
	1980	1985	1986	1987	1988	1990	1993	2000	2030	1986	1987	1988	1990	1993	2000	2030
	(Millions of 1982 Dollars)															
WATER	**11.7**	**8.0**	**8.9**	**7.9**	**7.9**	**7.9**	**8.9**	**9.0**	**10.4**	**8.9**	**7.9**	**8.6**	**8.6**	**9.0**	**10.4**	**11.0**
WATERSHED			7.6	6.6	6.6	6.6	7.5	7.6	8.7	7.6	6.6	7.2	7.2	7.6	8.7	9.2
SOILS			1.3	1.3	1.3	1.3	1.4	1.4	1.7	1.3	1.3	1.4	1.4	1.4	1.7	1.8
MINERALS	**2.0**	**1.9**	**3.2**	**2.6**	**2.6**	**2.6**	**2.9**	**3.1**	**3.5**	**3.2**	**2.6**	**2.9**	**2.9**	**3.1**	**3.5**	**4.2**
RANGE	**3.1**	**2.3**	**2.0**	**2.1**	**2.1**	**2.1**	**2.6**	**2.6**	**2.8**	**2.0**	**2.1**	**2.6**	**2.5**	**2.6**	**2.8**	**3.1**
RECREATION	**2.3**	**1.6**	**1.4**	**1.5**	**1.5**	**1.5**	**2.3**	**2.6**	**3.3**	**1.4**	**1.5**	**2.3**	**2.4**	**2.6**	**3.3**	**4.6**
FOREST RECREATION			.6	.7	.7	.7	1.2	1.4	1.8	.6	.7	1.2	1.2	1.4	1.8	2.8
URBAN FORESTS			.8	.9	.9	.9	1.1	1.2	1.5	.8	.9	1.1	1.2	1.2	1.5	1.8
WILDERNESS	**.3**	**.2**	**.3**	**.3**	**.3**	**.3**	**.4**	**.6**	**.8**	**.3**	**.3**	**.4**	**.6**	**.6**	**.8**	**1.0**
TIMBER	**67.8**	**54.6**	**48.9**	**47.4**	**47.4**	**47.4**	**54.5**	**59.2**	**67.7**	**48.9**	**47.4**	**53.6**	**56.6**	**59.2**	**67.7**	**82.8**
INVENTORY			10.4	6.9	6.9	6.9	8.1	8.8	10.2	10.4	6.9	8.1	8.5	8.8	10.2	12.7
EVALUATION			3.0	1.9	1.9	1.9	2.2	2.5	3.0	3.0	1.9	2.2	2.4	2.5	3.0	3.5
BIOLOGY			15.3	16.0	16.0	16.0	18.0	19.2	21.9	15.3	16.0	17.4	18.4	19.2	21.9	25.8
GENETICS			2.3	4.0	4.0	4.0	4.4	4.6	5.3	2.3	4.0	4.4	4.4	4.6	5.3	6.5
PRODUCTION ECONOMICS			1.8	2.1	2.1	2.1	2.2	2.5	2.7	1.8	2.1	2.2	2.4	2.5	2.7	3.7
HARVESTING			2.1	1.9	1.9	1.9	2.7	2.9	3.2	2.1	1.9	2.7	2.7	2.9	3.2	4.2
PROCESSING			12.2	12.7	12.7	12.7	14.7	16.4	18.8	12.2	12.7	14.7	15.6	16.4	18.8	23.6
MARKETING ECONOMICS			1.8	1.9	1.9	1.9	2.2	2.3	2.6	1.8	1.9	2.1	2.2	2.3	2.6	2.8
WILDLIFE-FISH	**7.2**	**5.5**	**5.4**	**5.4**	**5.4**	**5.4**	**6.4**	**7.4**	**8.9**	**5.4**	**5.4**	**6.4**	**7.1**	**7.4**	**8.9**	**9.8**
PROTECTION	**37.2**	**25.5**	**22.7**	**20.8**	**20.8**	**20.8**	**22.9**	**24.2**	**27.2**	**22.7**	**20.8**	**22.9**	**23.1**	**24.2**	**27.2**	**32.3**
INSECTS			9.7	9.1	9.1	9.1	9.8	10.5	11.8	9.7	9.1	9.8	10.0	10.5	11.8	15.0
DISEASE			6.7	6.0	6.0	6.0	6.9	7.2	8.1	6.7	6.0	6.9	6.9	7.2	8.1	8.8
FIRE			6.3	5.7	5.7	5.7	6.2	6.5	7.3	6.3	5.7	6.2	6.2	6.5	7.3	8.5
PROGRAM TOTAL 1/	*	**106.5**	**100.4**	**96.6**	**96.6**	**96.6**	**108.0**	**118.0**	**135.0**	**100.4**	**96.6**	**108.0**	**112.0**	**118.0**	**135.0**	**163.9**
CONSTRUCTION	**4.3**	**1.4**	**.3**	**.3**	**.3**	**.3**	**1.5**	**3.2**	**3.8**	**.3**	**.3**	**1.5**	**2.2**	**3.2**	**3.8**	**5.7**
GEN ADMIN.	*	**12.3**	**11.4**	**12.5**	**12.5**	**12.5**	**12.7**	**13.9**	**14.8**	**11.4**	**12.5**	**12.7**	**13.7**	**13.9**	**14.8**	**18.0**
TOTAL RESEARCH	**135.9**	**120.2**	**112.1**	**109.4**	**109.4**	**109.4**	**122.2**	**135.1**	**153.6**	**112.1**	**109.4**	**122.2**	**127.9**	**135.1**	**153.6**	**187.6**

1/ Program total includes Washington Office Costs and some International Forestry Costs not included in the body of the table.

* Data not available.

Research Initiatives

To satisfy the additional needs identified for management and assistance of the Forest Service and other Federal, State, and private sector users of Forest Service research, approximately $44 million is needed in addition to the base program (figure 2). Although these needs exist now, funding in 1986 of about $100 million will not allow all of these needs to be addressed immediately.

The 1986 budget does provide a portion of the funds required for some of the initiatives. For example, acid deposition research is now being phased into the base program. Other initiatives will continually be phased into the base program in a similar manner. Emphasis will be placed on initiatives shown in figure 2, and described in figure 3.

The most distinct differences between the High Bound and Low Bound are the rates of implementation of currently identified initiatives and some reordering of priorities among initiatives. At the High Bound, by 2000 most initiatives could be incorporated into the base program; at the Low Bound, this level of funding would not be reached until 2030. This means that full implementation of some research initiatives would be deferred with potential negative impacts on resource management and production capability. Opportunities to develop new methods to mitigate environmental impacts of resource management activities would also be reduced. For example, high levels of NFS timber sales (above 15 billion board feet per year) will not be possible without new research technology to increase timber growth and utilization efficiency, and to mitigate environmental damage resulting from increased management activities. Similarly, management technology needed to meet increasing demands for wilderness, recreation, forage, wildlife, minerals, and water would be delayed under the Low Bound. Research capability to respond to emerging issues would also be reduced due to the necessity for laboratory closures and termination of some current research programs at the Low Bound.

INDUSTRY AND UNIVERSITY RESEARCH FUNDING AND PRIORITIES

Forestry research is also conducted by industry and the university community. Forest Service research planning and coordination with university forestry research programs is well established. Also, significant progress has been made in recent years toward better industry-Forest Service research coordination. Many States have strong forestry programs which continuously rely on technology developed at their Land Grant Forestry Schools and the Forest Service. Recently, major forestry development programs have been initiated in several States-- in Michigan, for example--to provide much needed economic growth to offset long-term economic declines in other industries.

Figure 2--Highlights of Forest Service Research Program

All Funds in Millions of 1982 Dollars

Additional high priority research initiatives
$44.2

RPA Initiatives

- Biotechnology (4.6)
- Acid Deposition Effects (4.4)
- Inventory Speed-up and Analysis (5.6)
- Wood Utilization (3.4)
- Chemicals from Wood (2.0)
- Critical Wildlife/Fish Habitat Issues (5.0)
- Mass Soil Movement and Sedimentation (2.2)
- Integrated Pest Management (3.9)
- Recreation Management Issues (1.9)
- Land Management Planning Techniques (.9)
- Softwood Production (6.0)
  --Pacific Coast
  --South
- Brush Control Measures (1.0)
- Water Yield/Water Quality (2.3)
- Advanced Logging Systems (1.0)
- International Forestry

(Selected initiatives are being incorporated into the base program as funding permits)

Base Program
FY 1986
$100.4

- Water
- Minerals
- Range
- Recreation
- Wilderness
- Timber Management
- Products & Harvesting
- Wildlife & Fish
- Protection

The base program is devoted to developing technologies that provide the following:

- Productivity gains
- Product quality improvement
- Environmental enhancement
- Baseline environmental data for forest management

FIGURE 3--RESEARCH INITIATIVES 1/

Biotechnology ($4.6 MM)

- Ability to alter the process of living cells.
- Improve tree growth, better protect the forest, and produce more useful products without increasing input costs.

Acid Deposition Effects $(4.4 MM)

- Learn about effects on forest ecology.
- Increase effectiveness of any control strategies.

Inventory Speed-up and Analysis ($5.6 MM)

- Provide more timely data on forest resources required by government and industry planners.
- Provide improved understanding of domestic and export markets and market cycles.

Wood Utilization ($3.4 MM)

- Provide reconstituted wood products and protect investments (fire, product reliability and toxic fumes.)
- Enhance U.S. industry competitiveness and consumer safety.

Chemicals from Wood ($2 MM)

- Improve chemical conversion process and find more efficient adhesives.
- Assist in creating new nonpetroleum-based industries, reduce pollution and expand use of less desirable tree species.

Critical Wildlife and Fish Habitat Issues ($5 MM)

- Learn about old growth wildlife interactions, anadromous fish, threatened and endangered species, etc.
- Help Federal and State agencies meet multiple use management goals and satisfy legal and regulatory mandates.

Mass Soil Movement and Sedimentation ($2.2 MM)

- Reduce site losses and negative impacts on stream channels.
- Provide necessary links between forest management practices and wildlife and fish habitat needs.

Integrated Pest Management (IPM) ($3.9 MM)

- Develop efficient, environmentally safe IPM techniques to minimize forest losses to insects and diseases.

Recreation Management Issues ($1.9 MM)

- Develop better ways to reduce conflicts, lower costs, and protect resources for growing outdoor recreation use.

Land Management Planning Techniques ($.9 MM)

- Improve the quality and reduce the cost of land use planning.

Softwood Productivity--Pacific Coast ($2.6 MM)

- Develop methods to increase harvests on steeper slopes and improve regeneration techniques.
- Develop better growth and yield models, and more refined tree breeding techniques.

Softwood Productivity--South ($3.4 MM)

- Develop improved planting techniques, genetically engineered seedlings, and more cost effective silvicultural practices for timber harvests in the South which are projected to rise from 4.1 billion cubic feet in 1980 to 7.3 billion cubic feet in 2030.

Brush Control Measures ($1 MM)

- Expand research to facilitate control of unwanted vegetation with the minimum use of herbicides necessary to maintain and enhance forest productivity.

Water Yield/Water Quality ($2.3 MM)

- Determine fate of chemicals and soil losses on water environment and enhance water runoff.

Advanced Logging Systems ($1 MM)

- Reduce costs and improve residue recovery.
- Develop ways to put more harvested timber on the market and integrate more operations.

International Forestry 2/

- Determine foreign trade potential.
- Protect forest product exports from insect and disease embargoes.
- Develop forest products for international markets.

1/ Dollar amounts shown are in constant 1982 dollars and are estimates of new funds needed annually for initiatives for the duration of planned studies.

2/ Funding for International Forestry is described on page 35.

INTERNATIONAL FORESTRY

The USDA Forest Service, as one of the largest forestry organizations in the world, has many scientists, training experts, and resource managers participating in international forestry programs. The level of participation could be expanded, depending upon the needs for additional work worldwide, the Agency's expertise, and potential benefits to U.S. interests.

International Forestry subject areas include: (1) research related to international trade, (2) technical assistance, and (3) international cooperation and technical exchanges.

Rationale for International Forestry includes:

- Increased concern for the U.S. competitive position in international forest products trade. The U.S. is the world's largest importer of forest products. For these reasons, it is important that other countries advance high quality management of forest resources.
- The need to continue and expand good working relationships with several countries, especially Canada and Mexico, relative to mutual economic, political and environmental concerns.
- Tropical deforestation is of growing world concern. This problem frequently results in adverse impacts on the local economy and subsequent impact on world and U.S. financial institutions. Recent problems in North Africa, specifically Ethiopia, are an example of this serious situation.
- Several problems relating to tropical and subtropical silviculture and utilization, for example, serve high priority domestic needs in the State of Hawaii, Puerto Rico, Guam, and the Pacific Trust Territories.

Table 12 shows International Forestry funding distributions within the Forest Service. At the High Bound, all three Forest Service program areas - NFS, S&PF, and Research - show increases in International Forestry activities. However, Research provides about two-thirds of total funding at both Bounds. Except for the funding of the Washington Office International Forestry Administrative Staff, all International Forestry activities described are supported as adjunct activities to domestic programs. Footnote 2 in the table describes additional support from other outside organizations or agencies.

Table 12--International Forestry Program Funding
(Million 1982 Dollars)

ADMINISTRATIVE UNIT	Historic	RECOMMENDED PROGRAM							
		Low Bound				High Bound			
	1982	1986	1990	2000	2030	1986	1990	2000	2030
NFS	.70	1.00	1.00	1.00	1.00	1.00	1.30	2.10	3.70
S&PF	.70	1.00	1.00	1.00	1.00	1.00	1.20	1.50	1.60
RESEARCH	3.10	4.10	4.10	6.00	8.00	4.10	5.30	7.20	9.20
OTHER 1/	.05	.06	.06	.06	.06	.06	.08	.11	.35
TOTAL 2/	4.55	6.16	6.16	8.06	10.06	6.16	7.88	10.91	14.85

1/ Includes Programs and Legislation and Administration expenditures.

2/ Additional funding for International Forestry from sources outside the Forest Service totaled $736,425 in 1982. Outside funding is expected to continue at approximately this level through fiscal year 1988 when the Agency for International Development (AID) Forestry Support Agreement expires. Then, for the remainder of the planning period, outside funding is expected to be approximately one-half million dollars per year.

APPENDIX A

1986-1990 PROGRAM COSTS IN 1986 DOLLARS

Costs and benefits used during the development of the 1985 RPA Program Update were developed and analyzed in constant 1982 dollars. The purpose of this was to allow for identification of changes in real costs or benefits, and to avoid estimating inflation or deflation.

In order to compare the total costs of implementing a particular program component, costs and benefits were aggregated into Decision Variables (DV). These DVs incorporated all the direct costs and benefits accountable to a particular program component. For example, the Timber DV includes not only direct timber costs, but necessary support costs from other resource areas such as wildlife, soils, water, and recreation necessary to accomplish the timber program. Outputs under the Timber DV included not only the timber sold, but also the outputs from the timber activity of other resources such as recreation and wildlife. This type of aggregation was very important to the development and analysis of different program levels for the RPA Program Update.

Decision Variables are not the same as Budget Line Items and are not directly comparable. This means that direct comparisons between the costs shown in the 1985 RPA Program Update by DVs and the costs described in the annual budget by Budget Line Items are difficult.

The costs displayed in the following tables show the first 5 years (1986-1990) of the RPA Program Update by Budget Line Items or aggregates of Budget Line Items in constant 1986 dollars for comparison with the budget.

Table 1--National Forest System RPA Program Costs, 1986-1990
(Million 1986 Dollars)

	Low Bound					High Bound				
Indicator	1986	1987	1988	1989	1990	1986	1987	1988	1989	1990
Minerals	27	26	26	26	26	27	26	33	35	37
Range	31	31	31	31	31	31	31	41	43	46
Recreation/Wilderness	126	119	119	119	119	126	119	191	200	215
Timber and Roads 1/	725	705	705	705	705	725	705	954	989	1,023
Wildlife/Fish	37	33	33	33	33	37	33	66	69	72
Protection & Support 2/	596	575	575	575	575	596	575	711	728	751
Sub-total NFS (Appropriated)	1,542	1,489	1,489	1,489	1,489	1,542	1,489	1,996	2,064	2,144
Allocated KV	116	152	152	152	152	116	152	96	108	119
Total/NFS (Appro. and KV)	1,658	1,641	1,641	1,641	1,641	1,658	1,641	2,092	2,172	2,263

1/ Includes Purchaser Credit Roads, excludes KV funds.

2/ Includes air, soil, and water support; land management and ownership; facilities and general roads; fire and fuel; general administration; and miscellaneous funds.

Table 2--State and Private Forestry RPA Program Costs, 1986-1990
(Million 1986 Dollars)

	Low Bound					High Bound				
Indicator	1986	1987	1988	1989	1990	1986	1987	1988	1989	1990
Forest Management	13.0	2.7	2.7	2.7	2.7	13.0	2.7	21.2	22.9	24.5
Forest Prod. Util.	.9	0	0	0	0	.9	0	2.9	3.0	3.2
St. Forest Res. Plans	0.1	0	0	0	0	0.1	0	3.2	3.3	3.4
Forest Pest Mgmt.	28.2	18.3	18.3	18.3	18.3	28.2	18.3	35.6	36.0	36.5
Coop. Fire Protection	13.0	3.3	3.3	3.3	3.3	13.0	3.3	16.2	17.1	18.0
Total S&PF 1/	56.1	25.1	25.1	25.1	25.1	56.1	25.1	80.0	83.3	86.6

1/ Total includes general administration costs not included in the body of the table.

Table 3--Research RPA Program Costs, 1986-1990
(Million 1986 Dollars)

	Low Bound					High Bound				
Indicator	1986	1987	1988	1989	1990	1986	1987	1988	1989	1990
Water, Soils, & Minerals	14.8	14.7	14.7	14.7	14.7	14.8	14.7	14.8	14.9	15.0
Range, Recreation, Wilderness, and Wildlife	11.1	11.3	11.3	11.3	11.3	11.1	11.3	14.3	14.8	15.3
Timber	59.8	56.8	56.8	56.8	56.8	59.8	56.8	65.3	67.2	69.0
Protection	27.8	27.3	27.3	27.3	27.3	27.8	27.3	28.0	28.0	28.2
Total Research 1/	126.5	124.0	124.0	124.0	124.0	126.5	124.0	138.0	141.2	144.4

1/ Includes construction and general administration costs not in body of table, excludes competitive grants.

APPENDIX B

NATIONAL GOALS, OPPORTUNITIES, AND PROGRAM RESPONSE

The 1985 RPA Program is organized around nine opportunity areas with goals. The goals are broad statements that describe a desired future resource situation for the Nation. The goals reflect leadership responsibilities of the Forest Service, but recognize the role of other agencies and groups.

Opportunities for responding to the goals by increasing supplies of renewable resources to meet projected demand were identified during the Assessment analysis process. The goals are displayed here by the nine opportunity areas, along with opportunities and the Program response.

Minerals and Energy Opportunity Area

Goal

PROVIDE FOR MINERAL PROSPECTING AND EXPLORATION, AND RESPOND TO PROPOSALS FOR MINERALS DEVELOPMENT, IN CONCERT WITH OTHER RESOURCE USES AND VALUES, AND PROVIDE TECHNOLOGY FOR RECLAMATION OF DISTURBED LANDS. EMPHASIZE ENERGY MINERALS AND MINERALS OF STRATEGIC IMPORTANCE.

Opportunities

Opportunities for responding to the minerals and energy goal include:

- Improving access to lands for efficient exploration and evaluation of the mineral resources.
- Streamlining leasing and permitting processes to reduce financial and market risks and enhancing efficient development of the mineral resources.
- Increasing knowledge through research to enhance rehabilitation of disturbed sites and increasing knowledge on effects of acid rain on forest ecosystems.

Recommended Program

The Program provides a receptive environment for mineral discovery and improved permit and leasing processing which will provide for increasing production of energy and nonenergy minerals from NFS lands. The number of cases handled by the Forest Service will increase over 50 percent between 1986 and 2030. The increase in funding projected by 2030 will allow the Forest Service to effectively evaluate and manage these activities to protect resource values and to streamline mineral and energy procedures. NFS management and research will emphasize improved techniques for mitigating impacts from surface mining activities. Research on acid deposition and its relationship to the use of energy minerals is a high priority.

Range Opportunity Area

Goal

PROVIDE FORAGE TO PROMOTE THE ECONOMIC STABILITY OF DEPENDENT LIVESTOCK PRODUCERS AND RURAL COMMUNITIES BY MAINTAINING THE CURRENT LEVEL OF FORAGE PRODUCTION ON NATIONAL FOREST SYSTEM LANDS, AND EXPANDING THIS LEVEL OF PRODUCTION WHERE COST EFFECTIVE. DEVELOP AND APPLY TECHNOLOGY, WHERE COST EFFECTIVE TO IMPROVE RANGE CONDITIONS AND TO COORDINATE LIVESTOCK AND OTHER MULTIPLE USES OF RANGELAND.

Opportunities

The opportunities to increase forage production and to improve the condition of forest and range lands for grazing include:

- Rehabilitating rangeland where cost effective by seeding palatable grasses and legumes and controlling poisonous plants, noxious weeds, and other undesirable plants and shrubs.
- Increasing the utilization of forage on forest and range lands by using improved grazing systems and livestock management practices.
- Constructing needed livestock improvements, such as fences and water developments where cost effective.
- Reducing forage losses by controlling wildfires, and range insects and diseases.
- Improving rangeland productivity through research on forage, integrating forage management with other land management strategies, and using fire to improve growing conditions.

Recommended Program

Permitted grazing on National Forests and Grasslands begins at 9.8 million AUMs in 1986 and reaches 10.3-11.3 million AUMs by 2030. Output levels are based on economic opportunities, other resource benefits, and the needs of dependent producers and communities. Opportunities to maintain and to enhance range condition and values are met through improved range management. Between 1986 and 2030, improved allotments will increase from 75 percent to 87-96 percent of all National Forest and Grassland grazing areas. These improvements involve more intensive management of vegetation and construction of structures such as fences and ponds that have desireable environmental benefits for soil and water resources, as well as fish and wildlife habitat. Range research is aimed at increasing productivity, providing improved habitat for game and nongame species, improving outdoor recreation opportunities, and improving watershed conditions.

Recreation Opportunity Area

Goal

PROVIDE OUTDOOR RECREATION OPPORTUNITIES AND EXPERIENCES BY PROVIDING ACCESS, SERVICES, AND FACILITIES, WHERE COST EFFECTIVE, THAT ARE NECESSARY TO MEET THE NATIONAL FOREST SYSTEM SHARE OF THE NATION'S DEMAND FOR OUTDOOR RECREATION, CONSISTENT WITH OTHER RESOURCE USES AND VALUES. PROVIDE TECHNOLOGY TO IMPROVE AND EXTEND RECREATION OPPORTUNITIES. MOVE TOWARD RECREATION USERS ASSUMING A GREATER SHARE OF THE COST OF PROVIDING RECREATION OPPORTUNITIES.

Opportunities

Most of the projected increase in demands for outdoor recreation on forest and range lands and inland water can be met. There are major opportunities in all parts of the country which include:

- Rehabilitating deteriorating sites and adequately maintaining existing facilities.
- Constructing additional facilities such as trails, campgrounds, picnic areas, and boat ramps.
- Improving access to forest and range land and inland water suitable for outdoor recreation, especially near urban areas.
- Improving the coordination and integration of outdoor recreation use with other uses.
- Providing recreation services and facilities through the private sector where there is a potential for profit.
- Developing technology through recreation and urban forestry research to integrate recreation management with other multiple-use objectives, to predict demand, to measure social benefits, to enhance visual quality, and to predict amenity values.
- Broadening the use of fees to cover program costs.

Recommended Program

The Assessment projects large increases in national demand for outdoor recreation. In response, recreation use on National Forests begins at 215 million RVDs in 1986 and reaches 340-400 million RVDs by 2030. This program capitalizes on cost-effective opportunities including recreation opportunities provided by other resource management activities, and effective use of volunteer programs. It emphasizes protection of current investments in recreation facilities and trails to avoid both loss of recreation opportunities and higher long-term costs of replacement if maintenance is deferred too long. User fees will be increased to cover a greater share of recreation program costs. State and Private Forestry provides technical assistance to forest landowners for improving access to lands for outdoor recreation, particularly near urban areas of the Northeast. Research provides information and technology to integrate recreation management with other multiple-use objectives.

Wilderness Opportunity Area

Goal

MANAGE NATIONAL FOREST WILDERNESS AND PROVIDE RESEARCH TO ENHANCE THE QUALITY OF WILDERNESS EXPERIENCES AND MEET OTHER PURPOSES OF THE WILDERNESS ACT. RECOMMEND ADJUSTMENTS WHERE APPROPRIATE TO THE NATIONAL WILDERNESS PRESERVATION SYSTEM BASED ON THE RELATIVE VALUES INVOLVED IN A WAY WHICH COMPLETES THE NATIONAL FOREST PORTION OF THAT SYSTEM TO BEST MEET THE NEEDS OF THE AMERICAN PEOPLE.

Opportunities

The projected increases in demand for wilderness areas can be met. The major opportunities are:

- Completing the review of all suitable Federal lands and recommending to the Congress those units that warrant designation.
- Restoring primitive quality of designated lands by removal of incompatible uses and improvements.
- Improving management and information techniques to redirect more users to underutilized wilderness and nonwilderness areas and facilities.
- Improving wilderness visitor management, and reducing ecological impacts of visitor use through research.

Recommended Program

Wilderness acres, which reflect recent and anticipated legislation, are projected to increase from 32 million in 1986 to 35-40 million in 2030. The effect of the additional wilderness designations is incorporated in the program. Activities to protect wilderness values will focus on improvements to the trail system and administration and management of the wilderness system for all wilderness uses. Research is directed at improved management and protection techniques.

Timber Opportunity Area

Goal

MEET GROWING DOMESTIC AND EXPORT DEMANDS FOR WOOD PRODUCTS BY USING ECONOMIC OPPORTUNITIES FOR MANAGEMENT AND ASSISTANCE, AND BY DEVELOPMENT OF NEW TECHNOLOGY TO INCREASE AND EXTEND TIMBER SUPPLIES WHILE PROTECTING THE ENVIRONMENT AND PROVIDING OPPORTUNITIES FOR WILDLIFE, RECREATION, AND OTHER MULTIPLE USES OF FOREST LANDS.

Opportunities

There are three major ways to respond to rising demand for timber: (1) extend supplies through improved utilization, (2) increase net annual growth, and (3) increase harvests from the existing timber resource. More specifically:

(1) Timber supplies can be extended by:

- Increasing the useful life of wood products by preservative treatments; using less wood in the design of new structures; and renovating and maintaining existing structures rathern than replacing them.
- Improving efficiency in wood products processing, construction, and manufacturing.
- Utilizing unused wood materials such as logging residues; treetops and limbs; rough, rotten, and salvageable dead trees; and trees in urban areas and fence rows.

(2) Net annual timber growth can be increased by:

- Regenerating nonstocked and poorly-stocked commercial timberlands, regenerating mature stands, and converting existing stands to more desirable species.
- Developing and applying intensive timber management practices such as spacing control, fertilization, use of genetically improved trees, and vegetation management.
- Using management control and harvesting practices to reduce losses caused by natural mortality, undesirable vegetation, wildfire, insects, diseases, and poor logging practices.

(3) Harvests from the existing timber resource can be increased by:

- Accelerating harvests on National Forests in Washington, Oregon, northern California, northern Idaho, and western Montana that have large inventories of old-growth softwood timber.
- Increasing softwood and hardwood timber harvests in the East.
- Reducing costs and enhancing revenues, to provide increased investment opportunities.

In these latter cases, sustaining increased harvests on the National Forests in the West and on the forest lands in the East beyond a few decades requires large investments in more intensive management programs to

increase net annual timber growth. This will include providing technical and financial assistance to private landowners.

Recommended Program

In response to timber demands projected in the Assessment, timber offered for sale from the National Forest System begins at 11.4 BBF in 1986 and increases to 15.6 to 20.0 BBF by 2030. New technology will provide additional economic opportunities in the long term, and values of other resource benefits are considered within the timber harvest program. Most of the timber volume offered will generate revenue exceeding costs; and opportunities will be sought to further reduce the number of below cost sales through cost reduction or revenue increases. A timber harvest is also planned for other objectives such as improved wildlife habitat, increased recreation opportunity, and community stability. Opportunities to increase timber supply, productivity, and harvest are balanced in the context of all benefits from forest resources. For S&PF, the program will encourage states to provide higher timber outputs through increased technical assistance to nonindustrial landowners, and technical assistance to loggers and processors to encourage more complete and efficient use of wood. The major emphasis from Research is on increasing softwood timber productivity and hardwood quality, improving forest inventory, and improving resource supply and demand information.

Water Opportunity Area

Goal

PROVIDE FOR FAVORABLE CONDITIONS OF WATERFLOW, HELP PROVIDE FOR CONSUMPTIVE AND NONCONSUMPTIVE USES OF WATER, AND HELP MEET LONG-TERM WATER QUALITY NEEDS THROUGH MANAGEMENT, ASSISTANCE, AND TECHNOLOGY. INCREASE WATER YIELDS WHERE COST EFFECTIVE IN WATER-SHORT AREAS, CONSISTENT WITH OTHER RESOURCE USES AND VALUES. REDUCE FLOOD LOSSES WHERE ECONOMICALLY FEASIBLE.

Opportunities

This goal establishes direction for programs for forest and range lands that contribute to current and future water supplies and protect water quality. Long-term, as used in this goal, is a modifier intended to preclude overly strict interpretation of the goal. Essentially all activities, whether timber harvesting, construction and use of hiking trails, or establishing wildlife food plots, involved some disturbance and have some impact on water quality. This goal does not preclude temporary, but reversible, adverse impacts on water quality. Opportunities include:

- Striking a balance between the public's concern for resource production and environmental protection. This includes keeping certain waters of exceptional quality from deteriorating and reducing flood hazards where cost effective.
- Carrying out soil and water improvement activities on lands with declining watershed conditions.
- Providing technical and financial assistance to States and emphasizing research development and application to increase water yields.
- Modifying timber harvests to increase water yield.
- Increasing water supplies, where they are a limiting factor, to allow industrial, municipal, and energy development.
- Protecting the long-term productivity of the land.
- Reducing flood hazards.
- Improving prediction of soil erosion and sediment yield, improving snow management practices, and developing improved information on nutrient cycling through research.

Recommended Program

Management on National Forest lands maintains or enhances long-term water supplies and water quality. Opportunities will be met through significant increases in soil and water inventory and improvements and water yield. Soil and water improvement activity for example, increases from 6,600 acres in 1986 to over 22,000 acres in 2030. Overall funding of soil and water programs will nearly double during this period. State and Private Forestry technical assistance emphasizes land management practices that maintain water quality and long-term soil productivity. Research focuses on development of improved water management technologies.

Wildlife and Fish Opportunity Area

Goal

ASSURE A DIVERSE, WELL-DISTRIBUTED PATTERN OF HABITATS FOR VIABLE POPULATIONS OF WILDLIFE AND FISH SPECIES IN COOPERATION WITH STATES AND OTHER AGENCIES. PROVIDE TECHNOLOGY AND MANAGE HABITAT TO HELP RECOVER THREATENED AND ENDANGERED SPECIES AND INCREASE THE PRODUCTIVITY FOR NATIVE GAME AND NONGAME SPECIES CONSISTENT WITH OTHER RESOURCE USES AND VALUES AND USER DEMANDS.

Opportunities

There are some opportunities to respond to all the diverse demands on the wildlife and fish resource. These include:

- Improving wildlife and fish habitats by increasing food supplies and suitable cover, improving water quality and availability, and improving the distribution of habitat.
- Integrating, more fully, wildlife and fish objectives in the management of other forest and range land renewable resources.
- Providing better access by constructing trails, boat landings, and obtaining rights-of-way where the wildlife and fish resources are underutilized.
- Controlling land and water pollution, especially the use of pesticides that adversely affect wildlife and fish.
- Expanding wetland nesting habitats through fee purchase of key tracts and easements, and preserving and enhancing migration and wintering habitats.
- Increasing the reintroduction of displaced species in areas where suitable habitats exist or are developed.
- Increasing efforts to define, protect, improve, and augment essential habitats of endangered and threatened species and the habitat of other important species adversely affected by changes in management or use.
- Removing barriers to fish migration.
- Improving or developing new technology to identify habitat requirements and improving wildlife and fish habitat through research.
- Expansion of fees and State investments to accomplish Program goals.

Recommended Program

The Assessment projects increases in wildlife and fish use; this Program responds with balanced attention to all habitats and provides for use (WFUDs) starting at 23 million in 1986 and reaching 28 to 40 million in 2030. Emphasis is placed on commercial fisheries investments which would increase outputs by 27 to 67 percent during the planning period. Threatened and Endangered (T&E) species are also emphasized through measures to improve habitats for T&E and sensitive species in cooperation with States and other agencies. Assistance to private landowners for wildlife and fish occurs mainly in the East where private forest lands comprise a large portion of the total, and where hardwood stands favor a wide variety of game and nongame species. Research concentrates on developing management techniques to improve habitat and increase fish and wildlife production.

Protection and Support Opportunity Area

Goal

COMMENSURATE WITH NATURAL RESOURCE GOALS FOR FOREST AND RANGE LANDS, PLAN AND EXECUTE COST-EFFECTIVE PROTECTION AND PROGRAM SUPPORT IN FACILITIES, FIRE, PESTS, LANDS, AND OTHER SUPPORTING ACTIVITIES. EMPHASIZE PREVENTION, AND WHERE APPROPRIATE, MITIGATION OF RESOURCE LOSS AND DAMAGE. COOPERATE WITH LOCAL, STATE, OTHER FEDERAL AGENCIES, AND PRIVATE LANDOWNERS IN RESEARCH, FOREST PEST MANAGEMENT, WILDLAND FIRE MANAGEMENT, AND OTHER RESOURCE PROTECTION PROGRAMS. PARTICIPATE IN ECONOMICALLY PRODUCTIVE HUMAN RESOURCE PROGRAMS THAT SUPPORT COMMUNITY DEVELOPMENT AND STABILITY.

Opportunities

Opportunities to respond to the direction of this goal include:

- Providing cost-effective fire management programs on National Forests, including use of prescribed fire.
- Providing cost-effective fire protection on private and other public lands through financial and technical assistance to State and local governments, including rural wildfire training and improved fire response capabilities.
- Providing technical assistance to reduce fire hazards and risks at the urban-wildland fringe through education, fuel modification, hazard reduction, and vegetation management, including effective use of prescribed fire.
- Providing technical assistance, training, and new technology to Federal, State, and private cooperators for implementing integrated pest management programs.
- Implementing an integrated pest management program on National Forest System lands to protect, maintain, and enhance the production and quality of forest and range land resources.
- Improving and maintaining soil productivity through application of soil management practices, and inventory and analysis of the soil resource.
- Reducing soil erosion by timely revegetation of disturbed areas and application of improved engineering and land management technology.
- Reducing air pollution from forest and range activities through development, application and timing of improved management practices and, through research, improving predictive capabilities and understanding of air pollution and its effects on forest and range land resources.
- Managing prescribed fire to reduce smoke impacts on air quality.
- Maintaining a land ownership adjustment program that optimizes ownership patterns, reduces administrative costs, facilitates resource development, prevents trepass, and resolves management conflicts with adjacent owners.
- Administering special-use permits, including FERC licenses, to ensure compliance with permit terms and to obtain a fair return on non-Federal uses of NFS lands.
- Reducing trespass, promoting full resource management, preventing loss of revenue, and promoting good neighbor relations by marking and maintaining property boundaries.
- Maintaining records on land ownership, special use permits, rights-of-way, and other real estate status records.
- Inventorying, protecting, and interpreting appropriate cultural resources.
- Improving health and safety of forest and range land visitors through cooperative law enforcement, water and sanitation improvements, road maintenance, public safety, and education programs.
- Incorporating and monitoring protection and support activities through National Forest land and resource management planning and Statewide forest resources planning efforts.
- Aiding States in the identification of prime forest lands for retention and improving long-term management.
- Encouraging retention of private forest and range lands for forest and agricultural use through involvement in local and State land use planning, recommending tax policy revisions, and educating the owners about the commercial potential of these lands.
- Maintaining facilities needed to protect and support management activities on National Forest System lands.
- Developing new technology to improve understanding of the basic biology, ecology, and dynamics of insect populations; creating new and improved insect suppression techniques; and reducing disease-caused mortality of tree seedlings.
- Implementing vegetation management techniques to improve water yields, reduce fire hazards and improve watershed conditions.

- Providing opportunities for resource-related employment for the aged, youth, and the disadvantaged to enhance human and resource values and community stability.

Recommended Program

Protection and Support activities for NFS programs in aviation and fire, land management, and human resource programs meet long-term objectives, but will require a high level of risk management for future uncertainty. Facilities support (buildings and roads) are at low levels from 1986-1990 and then increase to meet the need for rehabilitation and reconstruction. Cooperative fire protection is enhanced by improved economic efficiency of fire programs commensurate with the value of resources, products, and property protected. A high level of forest insect and disease protection on Federal lands and a moderate level of protection on State and private lands is achieved with S&PF planning assistance and management improvement efforts aimed toward States assuming greater responsibility. Research emphasizes integrated pest management systems and improved fire management techniques.

International Forestry Opportunity Area

Goal

EXERCISE LEADERSHIP AND COOPERATION WITH APPROPRIATE UNITED STATES AGENCIES, OTHER NATIONS, AND INTERNATIONAL ORGANIZATIONS TOWARD ASSISTING OTHER NATIONS IN IMPROVING MANAGEMENT OF THEIR FOREST AND RANGE LAND RESOURCES SO AS TO MEET THEIR OWN NEEDS, PROTECT THE GLOBAL ENVIRONMENT, AND AVOID EXTINCTION OF SPECIES. IDENTIFY POTENTIAL OPPORTUNITIES FOR INTERNATIONAL TRADE IN FOREST PRODUCTS. ENGAGE IN INTERCHANGE OF RESEARCH AND TECHNICAL ASSISTANCE WITH OTHER NATIONS.

Opportunities

A large amount of technical and managerial knowledge is available to increase the production of wood and forage. Through domestic and international programs, the United States can advance the scientific and technological means to increase and/or conserve timber and range resources as well as to protect soils, watershed, and endangered species, especially in tropical forested regions of the world. United States participation in international forestry programs of mutual concern is in our best interest. For example, the U.S, Canada and Mexico have several mutual forest, insect, and disease problems. Opportunities include:

- Using specialists from within the Forest Service and from collaborating Federal and State agencies, universities, forest and range industries, and allied organizations to provide advisory services and/or technical exchange on projects or through resident assignments.

- Developing world timber demand and supply data bases.

Recommended Program

International Forestry efforts respond to the goal by identifying and facilitating international forest products trade opportunities; and assisting in the mitigation of major international forestry problems such as tropical deforestation and control of fire, insects, and diseases. Increasing cooperation and involvement in International Forestry will occur in the NFS, S&PF, and Research programs to meet these needs.

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